Modicon M340 automation platform

Catalogue

January 2011

Schneider Electric

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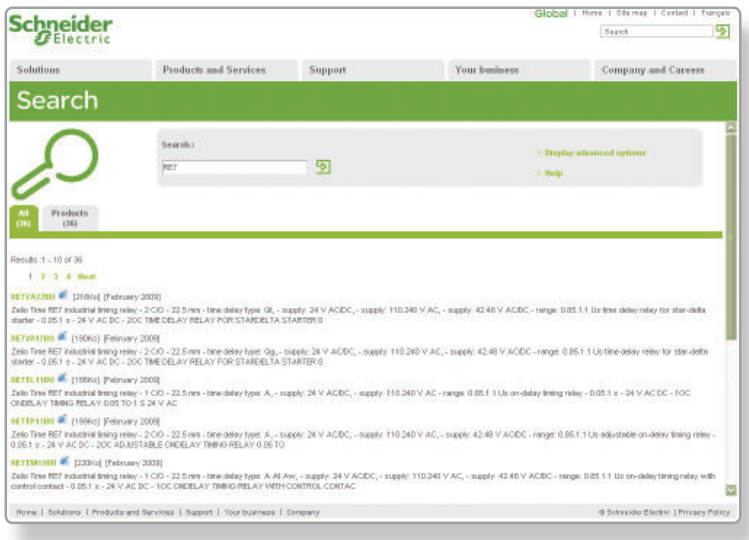
Browse the “product data sheet” to check out :

- characteristics,
- dimensions,
- curves, ...
- and also the links to the user guides and the CAD files.

1 From the home page, type the model number* into the “Search” box.

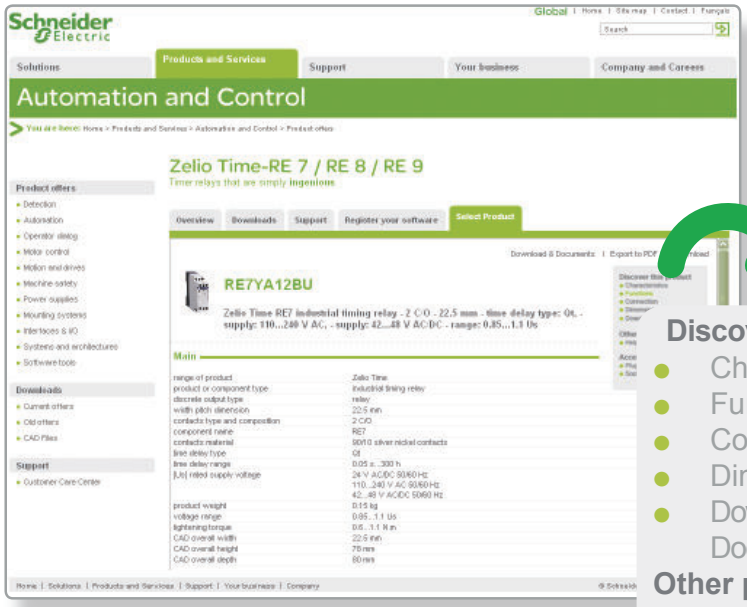
* type the model number without any blank, replace “●” by “*”

2 Under ”All” tab, click the model number that interests you.



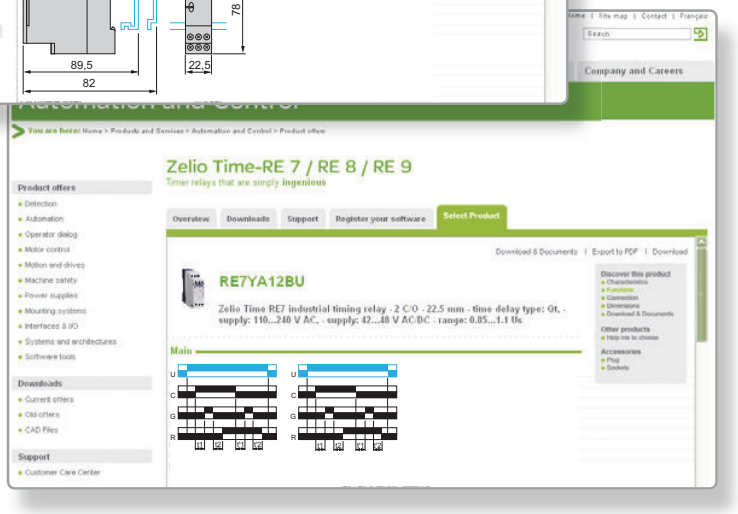
3 The product data sheet displays.

Example : Zelio Time data sheet



Example : Zelio Time data sheet

Example : Zelio Time data sheet



☑ You can get this information in one single pdf file.

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Modicon M340 automation platform

Modicon M340 processors

1

Modicon M340 platform for Unity Pro software offer			BMX 34 10 Standard processor	BMX 34 20 Performance processors
Racks	Number of racks		2 (with 4, 6, 8 or 12 slots)	4 (with 4, 6, 8 or 12 slots)
	Max. number of slots (excluding power supply module)		24	48
I/O	In-rack discrete I/O *(1)*		512 channels (modules with 8, 16, 32 or 64 channels)	1024 channels (modules with 8, 16, 32 or 64 channels)
	In-rack analog I/O *(1)*		128 channels (modules with 2, 4, 6 or 8 channels)	256 channels (modules with 2, 4, 6 or 8 channels)
	Distributed I/O		Limited depending on the type of medium: on Ethernet Modbus/TCP network via network module (63 devices with I/O Scanning function), on Modbus link (32 devices)	
In-rack application-specific channels	No. of channels (counter, motion control, serial link)		20 max.	36 max.
	Counter *(1)*		BMX EHC 0200 2-channel (60 kHz) or BMX EHC 0800 8-channel (10 kHz) modules	
	Motion control *(1)*		BMX MSP 0200 2-channel PTO (*Pulse Train Output*) modules for servo drives	
			–	
	Serial link (process or RTU) *(1)*		BMX NOM 0200 2-channel module or BMX NOR 0200H module with 1 RTU serial channel	
	Process control, programmable loops		Process control EFB library	
Integrated communication ports	Ethernet Modbus/TCP network		–	
	CANopen master bus		–	
	Serial link (process or RTU)		1 in RTU/ASCII Modbus master/slave mode or in Character mode (non-isolated RS232/RS485, 0.3…38.4 Kbps)	
	USB port		1 programming port (PC terminal) or HMI connection port	
Communication modules *(1)*	Ethernet network	Max. no.	2	2
		Type of module	BMX NOE 0100/0110 or BMX NOC 0401 network modules or BMX NOR 0200H module with 1 Ethernet RTU channel	
	AS-Interface bus	Max. no.	2	4
		Type of module	BMX EIA 0100 master module	
Internal memory capacity	Internal user RAM		2048 KB	4096 KB
	Program, constants and symbols		1792 KB	3584 KB
	Located/unlocated data		128 KB	256 KB
Memory card capacity (on processor)	Backup of program, constants and symbols		8 MB as standard	
	Hosting and display of user web pages		*(3)*	
	File storage		–	8 or 128 MB (according to BMX RMS ●●8MPF option card)
Application structure	Master task		1	
	Fast task		1	
	Event tasks		32	64
No. of K instructions executed per ms	100% Boolean		5.4 Kinstructions/ms	8.1 Kinstructions/ms
	65% Boolean + 35% fixed arithmetic		4.2 Kinstructions/ms	6.4 Kinstructions/ms
Rack power supply			24 V ⎓ isolated, 24…48 V ⎓ isolated or 100…240 V ∿ power supply module	
Modicon M340 processor			**BMX P34 1000**	**BMX P34 2000**
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*(1) The maximum values for the number of discrete I/O, analog I/O, counter/motion control/serial link channels and the number of networks are not cumulative (they are limited by the maximum number of slots in the configuration, 1 rack: **11**, 2 racks: **23**, 3 racks: **35** and 4 racks: **47**.*
*(3) User web pages with **BMX NOE 0110** Ethernet FactoryCast module (12 MB available).*

More technical information on www.schneider-electric.com

Schneider Electric

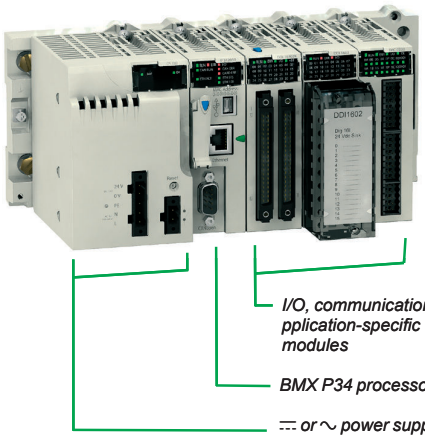
BMX 34 20 Performance processors (continued)

4 (with 4, 6, 8 or 12 slots)		
48		
1024 channels (modules with 8, 16, 32 or 64 channels)		
256 channels (modules with 2, 4, 6 or 8 channels)		
Limited depending on the type of medium: on CANopen bus (63 devices), on Ethernet Modbus/TCP network via network module (63 devices with I/O Scanning function), on Modbus link (32 devices)		
36 max.		
BMX EHC 0200 2-channel (60 kHz) or BMX EHC 0800 8-channel (10 kHz) modules		
BMX MSP 0200 2-channel PTO (*Pulse Train Output*) modules (200 kHz) for servo drives		
MFB (Motion Function Block) library (for drives or servo drives on CANopen bus)	–	MFB (Motion Function Block) library (for drives or servo drives on CANopen bus)
BMX NOM 0200 2-channel module or BMX NOR 0200H module with 1 RTU serial channel		
Process control EFB library		
–	1 x 10BASE-T/100BASE-TX (Modbus/TCP, BOOTP/DHCP, FDR client, e-mail notification, class B10 standard Web server)	
1 (63 slaves, 50…1000 Kbps, class M20) *(2)*	–	1 (63 slaves, 50…1000 Kbps, class M20) *(2)*
1 in RTU/ASCII Modbus master/slave mode or in Character mode (non-isolated RS232/RS485, 0.3…38.4 Kbps)		–
1 programming port (PC terminal) or HMI connection port		
2		
BMX NOE 0100/0110 or BMX NOC 0401 network modules or BMX NOR 0200H module with 1 Ethernet RTU channel		
4		
BMX EIA 0100 master module		
4096 KB		
3584 KB		
256 KB		
8 MB as standard		
(3)		
8 or 128 MB (according to BMX RMS ●●8MPF option card)		
1		
1		
64		
8.1 Kinstructions/ms		
6.4 Kinstructions/ms		
24 V ⎓ isolated, 24…48 V ⎓ isolated or 100…240 V ∿ power supply module		
BMX P34 20102	**BMX P34 2020**	**BMX P34 20302**

(2) **BMX P34 20102/20302** *processors can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products. Requires Unity Pro software, version ≥ V4.1.*

Modicon M340 automation platform
Processor modules

1



Presentation

Modicon M340 automation platform Standard processors, **BMX P34 1000**, and Performance processors, **BMX P34 2●●●●** , manage single-rack or multi-rack PLC stations whose slots can be equipped with:
- Discrete I/O modules
- Analog I/O modules
- Communication modules: Ethernet Modbus/TCP network, AS-Interface actuator/sensor buses and RTU *(Remote Terminal Unit)*
- Application-specific modules: counter, axis control and serial link

The five processors offered have different memory capacities, processing speeds, number of I/O and number and type of communication ports.

In addition, depending on the model, they offer a maximum (non-cumulative) of:
- 512 to 1024 discrete I/O
- 128 to 256 analog I/O
- 20 to 36 application-specific channels *(1)* (process counter, motion control and serial link, or RTU)
- 0 to 3 Ethernet Modbus/TCP or Ethernet/IP networks (with or without integrated port and 2 network modules maximum)
- 4 “Full Extended master” AS-Interface V3 actuator/sensor buses, profile M4.0

Depending on the model, Modicon M340 processors include:
- A 10BASE-T/100BASE-TX Ethernet Modbus/TCP port
- A CANopen machine and installation bus port
- A Modbus or Character mode serial link port

Each processor has a USB TER port (for connecting a programming terminal or a Magelis XBT GT/GK/GTW, GTW HMI, or STU/STO HMI terminal) and is supplied with a memory card used for:
- Backing up the application (program, symbols and constants)
- Activating a standard Web server for the Transparent Ready class B10 integrated Ethernet port (depending on the model)

This memory card can be replaced by another type of memory card (to be ordered separately) that supports:
- Backing up the application and activation of the standard Web server (same as other card)
- An 8 MB or 128 MB storage area, depending on the option card, for storing additional data organized in a file system (directories and sub-directories)

For severe environments, see the “ruggedized” Modicon M340 parts on pages 6/2 to 6/9.

Design and setup of Modicon M340 applications

To set up Modicon M340 automation platform processors, you need either:
- Unity Pro Small programming software
- Unity Pro Medium, Large, Extra Large or XL Safety programming software identical to that used to set up Modicon Premium and Modicon Quantum automation platforms
- Depending on requirements, you may also need:
  - ▫ Unity EFB toolkit software for developing EF and EFB libraries in C language
  - ▫ Unity SFC View software for viewing and diagnostics of applications written in Sequential Function Chart (SFC) or Grafcet language

The function block software libraries provide Modicon M340 processors with the processing capability required to meet the needs of specialist applications in the following areas:
- Process control via programmable control loops (EF and EFB libraries)
- Motion control with multiple independent axis functions (MFB *(Motion Function Block)* library). The axes are controlled by Altivar 312/71 variable speed drives or Lexium 05/32 servo drives connected on the CANopen machine and installation bus.

Note: Compatibility of BMX P34 20102/20302 processors with the Unity Pro software version. ***BMX P34 20102/20302*** *processors with integrated CANopen bus are compatible with Unity Pro* ***version ≥ 4.1****. Both these processors can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products.*

(1) Maximum number of application-specific channels per station. Only the application-specific channels actually configured in the Unity application count.

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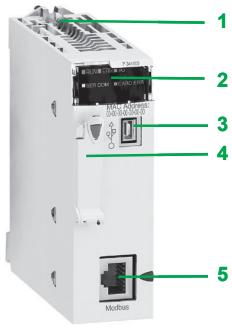
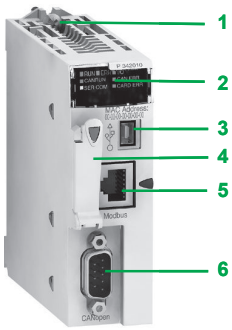
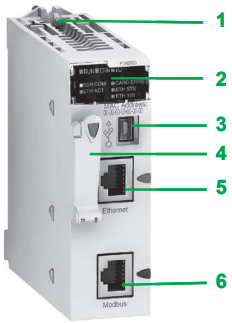
Modicon M340 automation platform
Processor modules



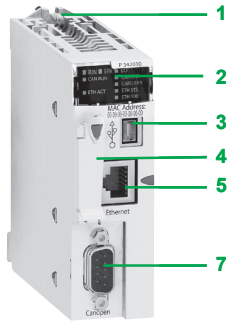
BMX P34 1000/2000



BMX P34 20102



BMX P34 2020



BMX P34 20302

Description of BMX P34 1000/2000/20102 processors

BMX P34 1000/2000/20102 Standard and Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack
2 A display block comprising 5 or 7 LEDs, depending on the model:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system fault
- I/O LED (red): I/O module fault
- SER COM LED (yellow): activity on the Modbus serial link
- CARD ERR LED (red): memory card missing or faulty
- CAN RUN LED (green): integrated CANopen bus operational (**BMX P34 20102** model only)
- CAN ERR LED (red): integrated CANopen bus fault (**BMX P34 20102** model only)

3 A mini B USB connector for a programming terminal (or a Magelis XBT GT/GK/GTW, GTW HMI, STU/STO HMI terminal *(1)*)
4 A slot equipped with its Flash memory card for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card)
5 An RJ45 connector for the Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, non-isolated)

With, in addition, for model **BMX P34 20102**:
6 A 9-way SUB-D connector for the integrated CANopen master bus

Description of BMX P34 2020/20302 processors with integrated Ethernet Modbus/TCP port

BMX P34 2020/20302 Performance single-format processors have the following on the front panel:

1 Safety screw for locking the module in its slot (marked 0) in the rack
2 A display block comprising 8 or 10 LEDs, depending on the model:
- RUN LED (green): processor in operation (program execution)
- ERR LED (red): processor or system fault
- I/O LED (red): I/O module fault
- SER COM LED (yellow): activity on the Modbus serial link
- CARD ERR LED (red): memory card missing or faulty
- ETH ACT LED (green): activity on the Ethernet Modbus/TCP network
- ETH STS LED (green): Ethernet Modbus/TCP network status
- ETH 100 LED (red): Ethernet Modbus/TCP data rate (10 or 100 Mbps)
- CAN RUN LED (green): integrated CANopen bus operational **(BMX P34 20302** model only)
- CAN ERR LED (red): integrated CANopen bus fault (**BMX P34 20302** model only)

3 A mini B USB connector for a programming terminal (or a Magelis XBT GT/GK/GTW, GTW HMI and STU/STO HMI terminal *(1)*)
4 A slot equipped with its Flash memory card for backing up the application (an LED, located above this slot, indicates recognition of or access to the memory card)
5 An RJ45 connector for connection to the 10BASE-T/100BASE-TX Ethernet Modbus/TCP network

With, in addition, depending on the model:
6 **BMX P 34 2020** processor: an RJ45 connector for the Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, non-isolated)
7 **BMX P 34 20302** processor: a 9-way SUB-D connector for the integrated CANopen master bus

On the back panel: 2 rotary switches for selecting the IP address assignment method for the module.

USB terminal port

The USB port **3** offering a useful data rate of 12 Mbps, is compatible with the Unity Pro programming software, the OPC Factory Server *(OFS)* and Magelis XBT GT/GK/GTW, GTW HMI and STU/STO HMI terminals *(1)*.

All **BMX P34** processors can be connected to a USB bus comprising several peripheral devices. However:
- Only one processor must be connected to the USB bus
- No device on the USB bus can be controlled by the PLC (modem, printer)

*(1) Magelis **XBT GT/GK/GTW, GTW HMI and STU/STO HMI** graphic terminals **with USB port and Vijeo Designer** configuration software version ⩾ 4.5. Please consult our "Human Machine Interfaces" catalogue*

Modicon M340 automation platform
Processor modules

Memory cards

BMX RMS 008MP memory card (supplied as standard)

Modicon M340 processors are supplied as standard with an SD *(Secure Digital)* type Flash memory card, **BMX RMS 008MP**. This card is intended for backing up the two memory areas on the processor module's internal RAM:
- Program, symbols and comments area, which contains the executable binary code and the IEC source code of the application program for the program part
- Constants area, which contains the constant data located by address

The data is backed up automatically by duplication, when the PLC is turned off. Likewise, the restoration of the data is transparent to the user, on return of power.

Capacity of the "backup area" on the memory card: 1792 KB for the **BMX P34 1000** Standard processor, 3584 KB for **BMX P34 2●●●●** Performance processors.

Processors with an integrated Ethernet port, **BMX P34 2020/20302,** have an additional 2 MB memory area specifically for "Standard Web services" (Transparent Ready B10) (see page 3/14).

The **BMX RMS 008MP** memory card is formatted by Schneider Electric and supplied with each processor. It is referenced as a replacement part.

BMX RMS 008MPF/128MPF optional memory cards

Performance processors, **BMX P34 2●●●●**, can take a **BMX RMS 008MPF** or **BMX RMS 128MPF** optional memory card in place of the standard memory card. In addition to the features of the standard card, this card also provides a "file storage area" with a maximum capacity of 8 MB (for the **BMX RMS 008MPF** card) or 128 MB (for the **BMX RMS 128MPF** card).

This "file storage area" enables:
- Any user-defined Word, Excel, PowerPoint or Acrobat Reader document (for example, maintenance manuals, diagrams. etc.) to be received via FTP
- Additional data (for example: production data, manufacturing recipes, etc.) to be stored via EFB user function blocks

Unity Pro programming software helps the application designer manage the structure and memory space occupation of the Modicon M340 automation platform.

Protecting the application

If necessary, it is possible to prohibit access to the application (in terms of reading and modifying the program) by only loading the executable code in the PLC.

Additionally, a memory protection bit, set in configuration mode, is also available to prevent any program modification (via the programming terminal or downloading).

From Unity Pro V5.0 on, the user has function blocks for protecting know-how by means of a signature that can be loaded and stored in the M340 processor module's Flash memory card (code not executed if the signature is not present).

Modifying the program in online mode

As with the Modicon Premium and Quantum platforms (with Unity Pro software), the online program modification function is available on the Modicon M340 automation platform with the option of adding or modifying the program code and data in different places in the application in a single modification session (thus ensuring modification is homogenous and consistent with the controlled process).
A dedicated memory area of the application internal RAM authorizes these program modification or addition sessions while complying with the recommendation to structure the application program in several, reasonably-sized sections.

Modicon M340 automation platform
Processor modules

BMX P34 1000

BMX P34 2000

BMX P34 20102
BMX P34 20302

BMX P34 2020

BMX RMS 008/128MPF

BMX XCA USB H0●●

Modicon M340 processors

I/O capacity	Max. no. of network and bus modules	Integrated communication ports	Compatibility with Unity Pro software	Reference	Weight kg
Standard BMX P34 10, 2 racks					
512 discrete I/O **128 analog I/O** **20 application-specific channels** 2048 KB integrated (internal user memory)	2 Ethernet networks 2 AS-Interface buses	1 Modbus serial link	Version ≥ 3.0	**BMX P34 1000**	0.200
Performance BMX P34 20, 4 racks					
1024 discrete I/O **256 analog I/O** **36 application-specific channels** 4096 KB integrated (**internal** user memory)	2 Ethernet networks 4 AS-Interface buses	1 Modbus serial link	Version ≥ 3.0	**BMX P34 2000**	0.200
		1 Modbus serial link 1 CANopen bus	Version ≥ 4.1	**BMX P34 20102**	0.210
		1 Modbus serial link 1 Ethernet network	Version ≥ 3.0	**BMX P34 2020**	0.205
		1 Ethernet network 1 CANopen bus	Version ≥ 4.1	**BMX P34 20302**	0.215

Memory cards

Description	Processor compatibility	Capacity	Reference	Weight kg
Flash memory cards (optional) *(2)*	BMX P34 2000 BMX P34 20102 BMX P34 2020 BMX P34 20302	8 MB + 8 MB file storage	**BMX RMS 008MPF**	0.002
		8 MB + **128 MB file** storage	**BMX RMS 128MPF**	0.002

Separate parts

Description	Use		Length	Reference	Weight kg
	From	To			
Terminal port/ USB cordsets	Mini B USB port on the Modicon M340 processor	Type A USB port on: - PC terminal - Magelis XBT GT/GK/ GTW, GTW HMI, STU/ STO HMI graphic terminal	1.8 m	**BMX XCA USB H018**	0.065
			4.5 m	**BMX XCA USB H045**	0.110

Replacement part

Description	Use	Processor compatibility	Reference	Weight kg
8 MB standard Flash memory card	Supplied as standard with each processor. Used for: - Backing up the program, constants, symbols and data - Activation of class B10 Web server	BMX P34 1000 BMX P34 2020 BMX P34 20102/20302	**BMX RMS 008MP**	0.002

(1) ***BMX P34 20102/20302*** *processors, combined with Unity Pro software version ≥ 4.1 can be used to customize configuration of the device Boot Up procedure compatible with all CANopen third-party products.*
(2) Memory cards for ***BMX P34 2●●●●*** *processors, to replace the standard memory card, used for:*
- Backing up the program, constants, symbols and data
- Activation of class B10 Web server
- File storage

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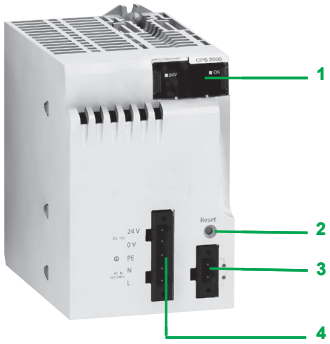
Modicon M340 automation platform
Power supply modules

1



Presentation

BMX CPS ●●●● power supply modules provide the power supply for each **BMX XBP ●●00** Modicon M340 rack and the modules installed on it.

The Modicon M340 power supply module offer comprises:
- Three power supply modules for DC line supplies:
  - 24 V ⎓ isolated power supply module, **BMX CPS 2010**
  - 24...48 V ⎓ isolated power supply module, **BMX CPS 3020**
  - 125 V ⎓ power supply module, **BMX CPS 3540T** (extended operating temperature -25° to +70°C)
- Two power supply modules for AC line supplies:
  - 100...240 V ∿, 20 W power supply module, **BMX CPS 2000**
  - 100...240 V ∿, 36 W power supply module, **BMX CPS 3500**

Description

The power supply module is selected according to:
- The electrical line supply: 24 V ⎓, 48 V ⎓, 125 V ⎓ or 100...240 V ∿
- The required power (see the power consumption table on page 7/16) *(1)*

BMX CPS ●●●● power supply modules have the following on the front panel:
1 A display block comprising:
- OK LED (green), lit if rack voltages are present and correct
- 24 V LED (green), lit when the sensor voltage is present (BMX CPS 2000/3500/3540T AC power supply modules only)

2 A pencil-point RESET pushbutton for a cold restart of the application

3 A 2-way connector that can take a removable terminal block (cage clamp or spring-type) for connecting the alarm relay

4 A 5-way connector that can take a removable terminal block (cage clamp or spring-type) for connecting the following:
- ⎓ or ∿ line supply
- Protective earth
- Dedicated 24 V ⎓ power supply for the input sensors (for BMX CPS 2000/3500/3540T AC power supply modules only)

Included with each power supply module:
- Set of two cage clamp removable terminal blocks (5-way and 2-way)

BMX XTS CPS10

To be ordered separately (if necessary)**:**
- Set of two spring-type removable terminal blocks (5-way and 2-way)

BMX XTS CPS20

Functions

Alarm relay

The alarm relay incorporated in each power supply module has a volt-free contact accessible on the front panel, on the 2-way connector.

The operating principle is as follows:
In normal operation, with the PLC in RUN, the alarm relay is energized and its contact is closed (state 1).
The relay de-energizes and its associated contact opens (state 0) whenever the application stops, even partially, due to any of the following:
- Occurrence of a blocking fault
- Incorrect rack output voltages
- Loss of supply voltage

(1) This power consumption calculation for the rack can also be performed by the Unity Pro programming software.

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Modicon M340 automation platform
Power supply modules

Functions (continued)

RESET pushbutton

The power supply module in each rack has a RESET button on the front panel which, when pressed, triggers an initialization sequence on the processor and the modules in the rack it supplies.
Pressing this pushbutton triggers a sequence of service signals, which is the same as that for:
- A power break, when the pushbutton is pressed
- A power-up, when the pushbutton is released

In terms of the application, these operations represent a cold start (forcing the I/O modules to state 0 and initializing the processor).

Sensor power supply

BMX CPS 2000/**3500** AC power supply modules and **BMX CPS 3540T** DC power supply modules have an integrated 24 V ⎓ supply for powering the input sensors.
Connection to this 24 V ⎓ sensor power supply is via the 5-way connector on the front panel.
The available power depends on the power supply module (0.45 A or 0.9 A).

References

Each **BMX XBP ●●00** rack must be equipped with a power supply module. These modules are inserted in the first two slots of each rack (marked CPS).
The power required to supply each rack depends on the type and number of modules installed in the rack. It is therefore necessary to draw up a power consumption table for each rack in order to determine which **BMX CPS ●●●0** power supply module is the most suitable for each rack (see page 7/16).

BMX CPS 2010/3020

BMX CPS 2000/3500

Power supply modules *(1)*

Line supply	Available power *(2)*				Nominal current	Reference	Weight
	3.3 V ⎓ *(3)*	24 V ⎓ rack *(3)*	24 V ⎓ sensors *(4)*	Total	24 V ⎓ rack *(3)*		kg
24 V ⎓ isolated	8.3 W	16.8 W	–	16.8 W	0.7 A	**BMX CPS 2010**	0.290
24...48 V ⎓ isolated	15 W	31.2 W	–	31.2 W	1.3 A	**BMX CPS 3020**	0.340
100...150 V ⎓	15 W	31.2 W	21.6 W	36 W *(5)*	1.3 A	**BMX CPS 3540T** *(5)*	0.340
100...240 V ∿	8.3 W	16.8 W	10.8 W	20 W	0.7 A	**BMX CPS 2000**	0.300
	15 W	31.2 W	21.6 W	36 W	1.3 A	**BMX CPS 3500**	0.360

Separate part

Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Spring-type	One 5-way terminal block and one 2-way terminal block	**BMX XTS CPS20**	0.015

Replacement part

Description	Type	Composition	Reference	Weight kg
Set of 2 removable connectors	Cage clamp	One 5-way terminal block and one 2-way terminal block	**BMX XTS CPS10**	0.020

*(1) Include a set of 2 cage clamp removable connectors. Spring-type connectors available separately under reference **BMX XTS CPS20**.*
(2) The sum of the power consumed on each voltage (3.3 V ⎓ and 24 V ⎓) must not exceed the total power of the module. See the power consumption table on page 7/16.
(3) 3.3 V ⎓ and 24 V ⎓ rack voltages for powering modules in the Modicon M340 PLC rack.
(4) 24 V ⎓ sensor voltage for powering the input sensors (voltage available via the 2-way removable connector on the front panel).
(5) Extended operating temperature -25° to +70°C (with power derating at extreme temperatures: 27 W between -25° and 0°C and between 60° and 70°C).

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Modicon M340 automation platform
Single-rack configuration

1

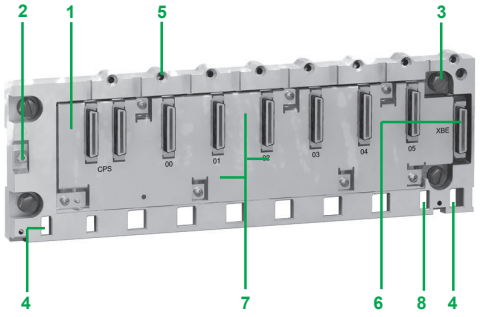
Presentation

BMX XBP ●●00 racks are the basic element in Modicon M340 platform single-rack and multi-rack configurations. They perform the following functions:
■ Mechanical function: they are used to install all the modules in a PLC station (power supply, processor, discrete, analog and application-specific I/O). These racks can be mounted on a panel, plate or DIN rail:
□ Inside enclosures
□ On machine frames, etc.
■ Electrical function: the racks incorporate a Bus X (proprietary bus). They are used to:
□ Distribute the power supplies required for each module in the same rack
□ Distribute data and service signals for the entire PLC station
□ Hot swap modules during operation

Description

BMX XBP ●●00 racks are available in 4, 6, 8 or 12-slot versions and comprise:
1 A metal frame that performs the following functions:
- Holds the Bus X electronic card and protects it against EMI and ESD type interference
- Holds the modules
- Gives the rack mechanical rigidity

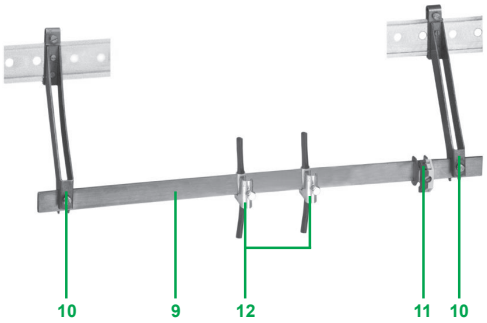
2 An earth terminal for earthing the rack
3 4 holes (big enough for M6 screws) for mounting the rack on a frame
4 2 fixing points for the shielding connection bar
5 Tapped holes to take the locking screw on each module
6 A connector for a rack expansion module, marked **XBE**
7 40-way female ½ DIN connectors forming the electrical connection between the rack and each module, marked **CPS**, **00**…**11** (the rack is delivered with each connector protected by a cover, which must be removed before inserting the module)
8 Slots for anchoring the module pins



BMX XBP 0600 rack with 6 slots

To be ordered separately:
A **BMX XSP ●●00** cable shielding connection kit, used to protect against electrostatic discharge when connecting the shielding on cordsets for connecting:
□ Analog, counter and motion control modules
□ A Magelis XBT operator interface to the processor (via **BMX XCA USBH0●●** shielded USB cable)

The **BMX XSP ●●00** shielding connection kit comprises:
9 A metal bar that takes the clamping rings and the earthing **terminal**
10 Two sub-bases to be mounted on the rack
11 An earthing terminal
12 Not included in the shielding connection kit, the **STB XSP 30●0** clamping rings (sold in lots of 10, cross-section 1.5…6 mm² or 5…11 mm²)



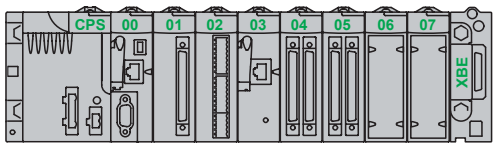
BMX XSP ●●00 cable shielding connection kit

Function

Addressing modules in a single-rack configuration *(1)*

Each rack must contain a power supply module and a processor module.

Installing the modules in the rack:
□ The power supply module always occupies the **CPS** slot
□ The processor module must always be installed in slot **00**
□ I/O modules and application-specific modules are installed from slot **01** to slot:
- **03** for a 4-slot rack
- **05** for a 6-slot rack
- **07** for an 8-slot rack
- **11** for a 12-slot rack



Example of installation with 8-slot rack

(1) For a multi-rack configuration with a BMX XBE 1000 rack expansion module (XBE slot), see page 1/12.

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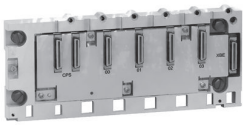
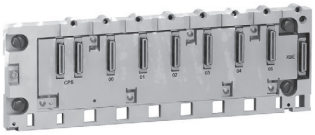
Schneider Electric

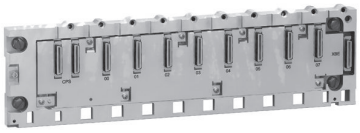
Modicon M340 automation platform
Single-rack configuration



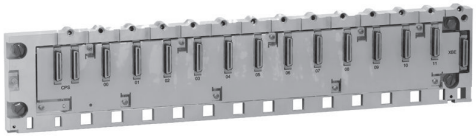
BMX XBP 0400



BMX XBP 0600



BMX XBP 0800

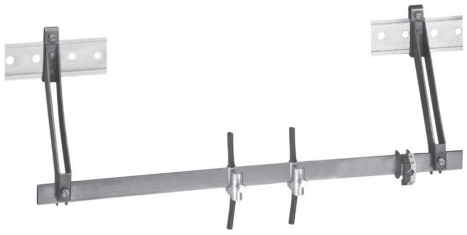


BMX XBP 1200

Racks

Description	Type of module to be inserted	No. of slots *(1)*	Reference	Weight kg
Racks	BMX CPS power supply, BMX P34 processor, I/O modules, communication modules and application-specific modules (counter, motion control and serial)	4	**BMX XBP 0400**	0.630
		6	**BMX XBP 0600**	0.790
		8	**BMX XBP 0800**	0.950
		12	**BMX XBP 1200**	1.270

(1) Number of slots taking the processor module, I/O modules, communication modules and application-specific modules (excluding power supply module).



STB XSP ●●00 + STB XP 30●0

Accessories

Description	For use with	Reference	Weight kg
Shielding connection kits comprising: - 1 metal bar - 2 support sub-bases - 1 earthing terminal	BMX XBP 0400 rack	**BMX XSP 0400**	0.280
	BMX XBP 0600 rack	**BMX XSP 0600**	0.310
	BMX XBP 0800 rack	**BMX XSP 0800**	0.340
	BMX XBP 1200 rack	**BMX XSP1200**	0.400
Spring clamping rings Sold in lots of 10	Cables, cross-section 1.5...6 mm²	**STB XSP 3010**	0.050
	Cables, cross-section 5...11 mm²	**STB XSP 3020**	0.070
Protective covers (replacement parts) Sold in lots of 5	Unoccupied slots on BMX XBP ●●00 rack	**BMX XEM 010**	0.005

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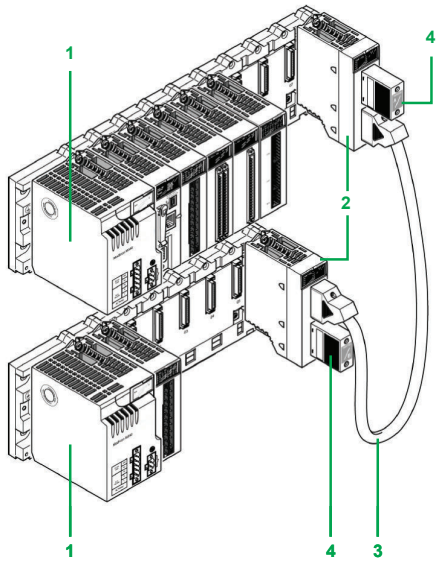
Modicon M340 automation platform

Multi-rack configuration



Composition of a multi-rack configuration

Multi-rack configurations are made up of standard **BMX XBP ●●00** racks. They comprise:

- 2 racks maximum for a station with **BMX P34 1000 processor**
- 4 racks maximum for a station with **BMX P34 2●●0 processor**

Each rack is equipped with:

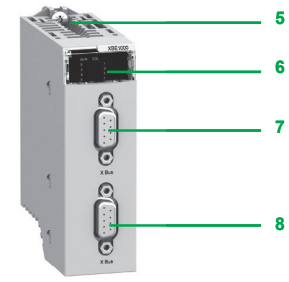
1 A **BMX CPS ●●●●●** power supply
2 A **BMX XBE 1000** rack expansion module This module, inserted in the right-hand end of the rack (**XBE** slot, see page 1/10) does not occupy rack slots **00**…**11** (4, 6, 8 or 12 slots are still available)
3 The **BMX XBE 1000** rack expansion modules are connected to each other by Bus X cordsets

Bus X

The racks, distributed on the Bus X, are connected to each other by Bus X extension cordsets **3** with a total length of **30 m maximum**.
The racks are connected in a daisy chain using **BMX XBC ●●0K** *(1)* Bus X extension cordsets connected to the two 9-way SUB-D connectors **7** and **8** on the front panels of the **BMX XBE 1000 rack expansion modules 2**.

Line terminators 4
Both expansion modules at the ends of the daisy chain must have a line terminator **4** **TSX TLY EX** on the unused 9-way SUB-D connector.

Note: *The processor module is always positioned in the rack at address 0. However, in a Bus X daisy chain, the order of the racks has no effect on operation. For example, the order of the daisy chain can be 0-1-2-3, 2-0-3-1 or 3-1-2-0,* ***etc.***



Description

The front panel of the **BMX XBE 1000** rack expansion module comprises:

5 Safety screw for locking the module in its slot (at the far right-hand end of the rack)
6 A display block with 5 LEDs:
- RUN LED (green): module in operation
- COL LED (red): several racks have the same address, or rack address 0 does not contain the **BMX P34 ●●●0** processor module
- LEDs 0, 1, 2 and 3 (green): rack address 0, 1, 2 or 3

7 A 9-way female SUB-D connector, marked Bus X, for the incoming Bus X cordset **3** connected to the upstream rack, or if it is the first rack, for the **A/** line terminator included in the **TSX TLY EX 4** pack
8 A 9-way female SUB-D connector, marked Bus X, for the outgoing Bus X cordset **3** to the downstream rack, or if it is the last rack, for the **/B** line terminator included in the **TSX TLY EX 4** pack

On the right-hand side panel
A flap for accessing the 3 rack addressing micro-switches: 0…3.

Installation rules for BMX XBP ●●●0 racks
Rules for installing racks in enclosures (see our website www.schneider-electric.com).

(1) ***BMX XBC ●●0K*** *extension cordsets, length 0.8 m, 1.5 m, 3 m, 5 m or 12 m, with angled connectors or* ***TSX CBY ●08K*** *extension cordsets, length 1 m, 3 m, 5 m, 12 m, 18 m or 28 m, with straight connectors.*

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Modicon M340 automation platform
Multi-rack configuration

BMX XBE 1000

Rack expansion

Description	Use	Reference	Weight kg
Modicon M340 rack expansion module	Standard module for mounting in each rack (**XBE** slot) and used to interconnect: - Up to 2 racks with BMX P34 1000 processor module - Up to 4 racks with BMX P34 2●●●● processor module	**BMX XBE 1000**	0.178
Modicon M340 rack expansion kit	Complete kit for 2-rack configuration comprising: - 2 BMX XBE 1000 rack expansion modules - 1 BMX XBC 008K extension cordset, length 0.8 m - 1 TSX TLY EX line terminator (set of 2)	**BMX XBE 2005**	0.700

BMX XBC ●●●K

Cordsets and connection accessories

Description	Use	Composition	Type of connector	Length	Reference	Weight kg
Bus X extension cordsets total length 30 m max.	Between 2 BMX XBE 1000 rack expansion modules	2 x 9-way SUB-D connectors	Angled	0.8 m	**BMX XBC 008K**	0.165
				1.5 m	**BMX XBC 015K**	0.250
				3 m	**BMX XBC 030K**	0.420
				5 m	**BMX XBC 050K**	0.650
				12 m	**BMX XBC 120K**	1.440
			Straight	1 m	**TSX CBY 010K**	0.160
				3 m	**TSX CBY 030K**	0.260
				5 m	**TSX CBY 050K**	0.360
				12 m	**TSX CBY 120K**	1.260
				18 m	**TSX CBY 180K**	1.860
				28 m	**TSX CBY 280K**	2.860
Cable reel	Length of cable to be fitted with TSX CBY K9 connectors	Cable with ends with flying leads, 2 line testers	–	100 m	**TSX CBY 1000**	12.320

TSX TLY EX

Description	Use	Composition	Sold in lots of	Reference	Weight kg
Line terminators	Required on the 2 BMX XBP ●●●0 modules located at either end of the daisy chain	2 x 9-way SUB-D connectors marked A/ and /B	2	**TSX TLY EX**	0.050
Bus X straight connectors	For TSX CBY 1000 cables	2 x 9-way SUB-D straight connectors	2	**TSX CBY K9**	0.080
Connector assembly kit	Fitting TSX CBY K9 connectors	2 crimping pliers, 1 pen *(1)*	–	**TSX CBY ACC 10**	–

(1) To fit the connectors on the cable, you also need a wire stripper, a pair of scissors and a digital ohmmeter.

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2

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2

Modicon M340 automation platform

Discrete I/O modules

Input modules

2

Applications		Input module 8 channels	16-channel input modules	
		Connection via cage clamp, screw clamp or spring-type removable block terminal		
Type		~	⎓	
Voltage		200…240 V	24 V	48 V
Current per channel		10.4 mA (for U = 220 V to 50 Hz)	3.5 mA	2.5 mA
Modularity (Number of channels and commons)		8 isolated inputs and 1 common	16 isolated inputs and 1 common	
Connection		Via 20-way cage clamp, screw clamp or spring-type removable terminal block BMX FTB 2000/2010/2020		
Isolated inputs	IEC/EN 61131-2 conformity	Type 2	Type 3	Type 1
	Logic	–	Positive *(sink)*	
	Type of input	Capacitive	Current sink	
	Sensor compatibility IEC/EN 60947-5-2	2-wire ~	2-wire ⎓, 3-wire ⎓ PNP any type	
Sensor power supply (ripple included)		170…264 V	19…30 V	38…60 V
Protection of inputs		Use one 0.5 A fast-blow fuse per group of channels		
Maximum dissipated power		4.73 W	2.5 W	3.6 W
Operating temperature		0…60°C		
Compatibility with installation help system TeSys Quickfit		–		
Compatibility with pre-wired system Modicon Telefast ABE 7	Passive connection sub-bases	–		
	Adaptor sub-bases with relays	–		
References		BMX DAI 0805	BMX DDI 1602	BMX DDI 1603
Page		2/12		

16-channel input modules

Connection via cage clamp, screw clamp or spring-type removable block terminal

∿ or ⎓	∿		⎓
24 V (∿ or ⎓)	48 V	100…120 V	125 V
3 mA (∿ or ⎓)	5 mA		2.4 mA
16 isolated inputs and 1 common			
Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable block terminal			
Type 1 (∿)	Type 3		–
Negative *(source)* (⎓)	–		Positive *(sink)*
Resistive	Capacitive		Current sink
2-wire ⎓/∿, 3-wire ⎓ PNP or NPN any type	2-wire ∿		–
19...30 V ⎓ 20…26 V ∿	40…52 V	85…132 V	88…150 V
Use one 0.5 A fast-blow fuse per group of channels			
3 W	4 W	3.8 W	8.5 W (at 40°C)
0…60°C			-25…70°C
–			
–			
–			

BMX DAI 1602	BMX DAI 1603	BMX DAI 1604	BMX DDI 1604T
2/12			

Modicon M340 automation platform

Discrete I/O modules

Input modules and mixed I/O modules

Applications		**32 or 64-channel high-density input modules** **Connection via 40-way connectors with preassembled cordsets**	
Type		⎓	
Voltage		24 V	
Current per channel	Inputs	2.5 mA	1 mA
	Outputs	–	–
Modularity (Number of channels and commons)		32 isolated inputs and 2 commons	64 isolated inputs and 4 commons
Connection		Via one 40-way connector	Via two 40-way connectors
Isolated inputs	IEC/EN 61131-2 conformity	Type 3	Non-IEC
	Logic	Positive *(sink)*	
	Type of input	Current sink	
	Sensor compatibility IEC/EN 60947-5-2	2-wire ⎓, 3-wire ⎓ PNP any type	–
Sensor power supply (ripple included)		19…30 V	
Protection of inputs		Use one 0.5 A fast-blow fuse per group of channels	
Isolated outputs	Fallback	–	
	IEC/EN 61131-2 conformity	–	
	Protection	–	
	Logic	–	
Preactuator power supply (ripple included)		–	
Output fuse protection		–	
Maximum dissipated power		3.9 W	4.3 W
Operating temperature		0…60°C	
Compatibility with installation help system TeSys Quickfit		LU9 G02 splitter boxes (8 motor starters) and BMX FCC ●●1/●●3 preassembled cordsets. See pages 2/9 and 2/13.	
Compatibility with pre-wired system Modicon Telefast ABE7	Passive connection sub-bases	Depending on model, 8 or 16-channel passive sub-bases, with or without LED, with common or 2 terminals per channel. See pages 5/2 and 5/8.	
	Adaptor sub-bases with relays	Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable), 16 channels, with common or 2 terminals per channel (screw or spring-type connection). See pages 5/2 and 5/8.	
References		**BMX DDI 3202K**	**BMX DDI 6402K**
Page		2/12	

16 or 32-channel mixed I/O module		
Connection via cage clamp, screw clamp or spring-type removable block terminal		**Connection via 40-way connector with preassembled cordsets**
⎓	⎓ and ∿ (outputs only)	⎓
Inputs: 24 V Solid-state outputs: 24 V	Inputs: 24 V ⎓ Relay outputs: 24 V ⎓ or 24…240 V ∿	Inputs: 24 V Solid-state outputs: 24 V
3.5 mA	3.5 mA	2.5 mA
0.5 A	2 A (⎓ or ∿)	0.1 A
8 isolated inputs and 1 common, 8 isolated outputs and 1 common		16 isolated inputs and 1 common, 16 isolated outputs and 1 common
Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable terminal block		Via one 40-way connector
Type 3		
Positive *(sink)*	–	Positive *(sink)*
Current sink		
2-wire ⎓, 3-wire ⎓ PNP any type		
19…30 V		
Use one 0.5 A fast-blow fuse per group of channels		
Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault		
Yes		
Protected	Not protected	Protected
Positive	–	Positive
19…30 V	19...30 V ⎓ 24...240 V ∿	19…30 V
Use a 2 A fast-blow fuse	Use a 12 A fast-blow fuse	Use a 2 A fast-blow fuse
3.7 W	3.1 W	4 W
0…60°C		
–		LU9 G02 splitter boxes (8 motor starters) and BMX FCC ●●1/●●3 preassembled cordsets. See pages 2/9 and 2/13.
–		Depending on model, 8 or 16-channel passive sub-bases, with or without LED, with common or 2 terminals per channel. See pages 5/2 and 5/8.
–		Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable) 16 channels, with common or 2 terminals per channel (screw or spring-type connection). See pages 5/2 and 5/8.
BMX DDM 16022	**BMX DDM 16025**	**BMX DDM 3202K**
2/13		

Modicon M340 automation platform

Discrete I/O modules

Output modules

Applications		**32 or 64-channel high-density output modules** **Connection via 40-way connectors with preassembled cordsets**	
Type		⎓ transistor	
Voltage		24 V	
Current per channel		0.1 A	
Modularity (Number of channels and commons)		32 **protected outputs and 2 commons**	64 **protected outputs and 4 commons**
Connection		Via one 40-way connector	Via two 40-way connectors
Isolated outputs	Fallback	Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault	
	IEC/EN 61131-2 conformity	Yes	
	Protection	Yes	
	Logic	Positive	
Preactuator power supply (ripple included)		19…30 **V** ⎓	
Output fuse protection		Use one 2 **A fast-blow fuse per group of channels**	
Maximum dissipated power		3.6 W	6.85 W
Operating temperature		0…60°C	
Compatibility with installation help system TeSys Quickfit		LU9 G02 splitter boxes (8 motor starters) and BMX FCC ●●1/●●3 preassembled cordsets. See pages 2/9 and 2/13.	
Compatibility with pre-wired system Modicon Telefast ABE7	Passive connection sub-bases	Depending on model, passive sub-bases with 8 or 16 channels, with or without LED, with common or with 2 terminals per channel. See pages 5/2 and 5/8.	
	Adaptor sub-bases with relays	Depending on model, active sub-bases with solid state or electromagnetic relays (fixed or removable). 16 channels with 1 common or 2 terminals per channel, screw or spring-type connection. See pages 5/2 and 5/8	
References		**BMX DDO 3202K**	**BMX DDO 6402K**
Page		2/12	

16-channel output modules			8 or 16-channel output modules		
Connection via cage clamp, screw clamp or spring-type removable block terminal					
⎓ transistor		∿ triac	⎓ relay	⎓/∿ relay	
24 **V**		100…240 **V**	100…150 **V**	24 **V** ⎓, 24…240 **V a**	
0.5 A		0.6 **A**	0.3 **A (Ith)**	2 **A (Ith)**	
16 protected outputs and 1 common		16 non-protected outputs and 4 commons	8 non-protected outputs, without common	16 non-protected outputs and 2 commons	
Via BMX FTB 2000/2010/2020 20-way cage clamp, screw clamp or spring-type removable block terminal					
Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault		Configurable output fallback			
Yes		Yes			
Yes		–			
Positive *(source)*	Negative *(sink)*	–			
19…30 V		100…240 V	100…150 V	19...30 V ⎓ 24...240 V ∿	
Use one 6.3 A fast-blow fuse per group of channels		Use one 3 A fast-blow fuse per group of channels	Use one 0.5 A, 250 V DC fast-blow fuse on each relay	Use one 3 A fast-blow fuse on each channel	Use one 12 A fast-blow fuse on each group of channels
4 W	2.26 W	–	3.17 W	2.7 W	3 W
0…60°C			-25…70°C	0…60°C	
–					
–					
–					

BMX DDO 1602	BMX DDO 1612	BMX DAO 1605	BMX DRA 0804T	BMX DRA 0805	BMX DRA 1605
2/12					

Modicon M340 automation platform
Discrete I/O modules

Presentation

Discrete I/O modules in the Modicon M340 offer are standard modules occupying a single slot on the rack. These modules are equipped with either of the following:
- A connector for a screw or spring-type 20-way removable terminal block
- One or two 40-way connectors

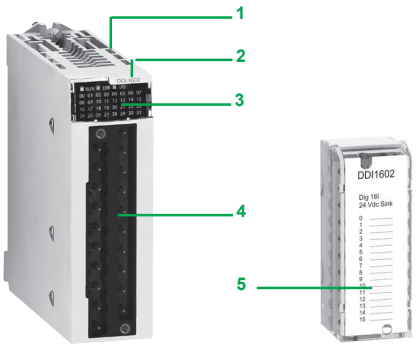
This wide range of "discrete" I/O can be used to meet whatever requirements arise in terms of:
- Functions, AC or DC I/O, positive or negative logic
- Modularity, 8, 16, 32 or 64 channels per module

The inputs receive signals from the sensors and perform the following functions:
- Acquisition
- Adaptation
- Electrical isolation
- Filtering
- Protection against interference signals

The outputs memorize commands issued by the processor to enable control of the preactuators via the decoupling and amplification circuits.

Description

BMX D●I/D●O/DRA discrete I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

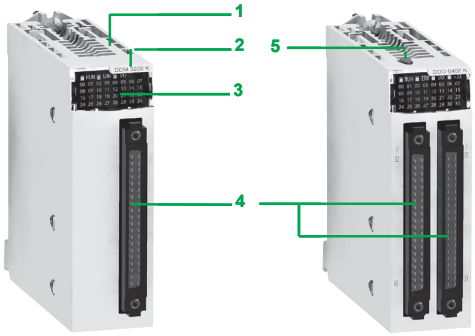


Module for connection via 20-way removable terminal block

I/O modules connected via 20-way removable terminal block

1 Rigid body providing support and protection for the electronic card
2 Module reference marking (a label is also visible on the right-hand side of the module)
3 Channel status display block
4 Connector taking the 20-way removable terminal block for connecting sensors or preactuators

To be ordered separately:
5 A **BMX FTB 20●0** 20-way removable terminal block (identification label supplied with each I/O module) or a preassembled cordset with a 20-way removable terminal block at one end and flying leads at the other (see page 2/9).



32 and 64-channel modules for connection via one or two 40-way connector(s)

I/O modules connected via 40-way connector(s)

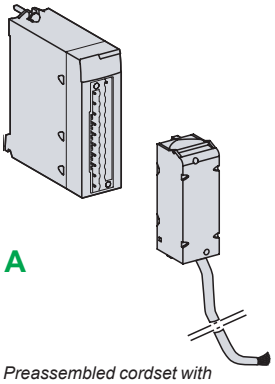
1 Rigid body providing support and protection for the electronic card
2 Module reference marking (a label is also visible on the right-hand side of the module)
3 Channel status display block
4 One or two 40-way connectors (32 or 64 channels) *(1)* for connecting sensors or preactuators
5 With the 64-channel module, a pushbutton which, with successive presses, displays the state of channels 0...31 or 32...63 on the display block **3** (see page 2/10)

To be ordered separately, depending on the type of module:
One or two preassembled cordset(s) with a 40-way connector (see page 2/9)

(1) Fujitsu FCN 40-way connector

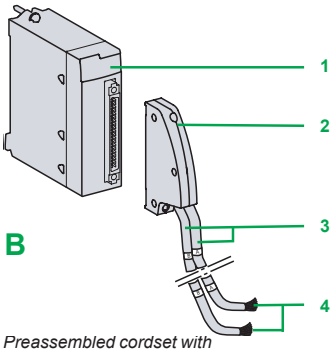
Processors: page 1/2 | Communication: page 3/2 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform
Discrete I/O modules



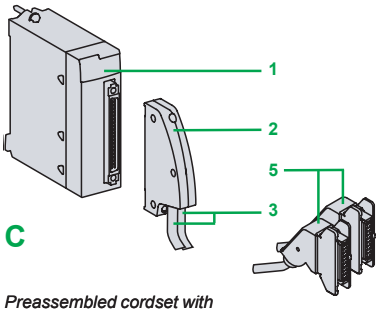
A

Preassembled cordset with 20-way removable terminal block at one end and flying leads at the other



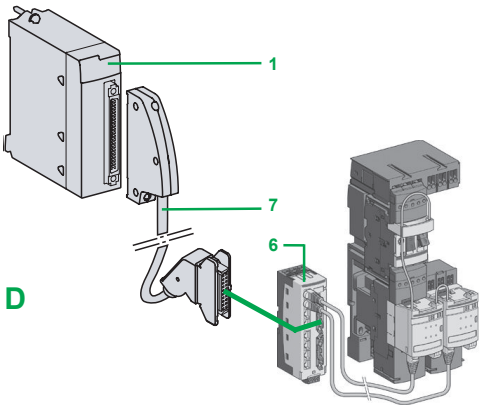
B

Preassembled cordset with 40-way connector and two ends with flying leads



C

Preassembled cordset with 40-way connectors and HE10 connectors for Modicon Telefast ABE 7 system



D

Example of connection to the TeSys Quickfit installation help system

Connecting modules with removable terminal blocks

There are three types of 20-way removable terminal block:
- Screw clamp terminal block
- Cage clamp terminal block
- Spring-type terminal block

Each removable terminal block can take:
- Bare wires
- Wires equipped with **DZ5 CE** cable ends

A : One version of the removable terminal block is equipped with 3, 5 or 10 m cordsets with colour-coded flying leads (**BMX FTW●●1**). Use limited to voltages of ⩽ 48 V.

Cage clamp terminal blocks

The capacity of each terminal is:
- Minimum: One 0.34 mm²wire (AWG 22)
- Maximum: One 1 mm² wire (AWG 18)

BMX FTB 2000 cage clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Screw clamp terminal blocks

The capacity of each terminal is:
- Minimum: One or two 0.34 mm² wires (AWG 22)
- Maximum: Two 1.5 mm² wires (AWG 15)

BMX FTB 2010 screw clamp connectors are equipped with captive screws (maximum tightening torque 0.5 N.m).

Spring terminals

The capacity of each terminal in the **BMX FTB 2020** spring-type terminal blocks is:
- Minimum: One 0.34 mm² wire (AWG 22)
- Maximum: One 1 mm² wire (AWG 18)

Connecting modules with 40-way connectors

Preassembled cordsets with 40-way connector at one end and flying leads at the other

B : Preassembled cordsets can be used for easy direct wire-to-wire connection between the I/O of modules with 40-way connectors **1** and the sensors, preactuators or intermediate terminal blocks.
These preassembled cordsets comprise:
- At one end, a 40-way connector **2** with either of the following:
  - One sheath containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMX FCW ●●1**)
  - Two sheaths **3**, each containing 20 wires with a cross-section of 0.34 mm² (AWG 22) (**BMX FCW ●●3**)
- At the other end, colour-coded flying leads **4** conforming to standard DIN 47100.

Preassembled cordsets with 40-way connector and HE 10 connector(s)

C : Two types of cordset can be used for connecting the I/O of modules **1** with 40-way connectors to Modicon Telefast ABE 7 rapid wiring connection and adaptation interfaces, (see page 5/8).
These preassembled cordsets comprise:
- At one end, a 40-way connector **2** with either of the following:
  - One sheath containing 20 wires (**BMX FCC ●●1**)
  - Two sheaths **3** each containing 20 wires (**BMX FCC ●●3**)
- At the other end, one or two HE 10 connectors **5**.

Connection to TeSys Quickfit system

D : **1** **BMX DDI 3202K/6402K** input modules, **BMX DDO 3202K/6402K** output modules and **BMX DDM 3202K** mixed I/O modules with 40-way connectors are designed, amongst other things, for use in conjunction with the TeSys Quickfit mounting system via the **LU9 G02 splitter module** **6** (for 8 motor starters).
The splitter modules are easily connected using **7** **BMX FCC ●●1**/**●●3** preassembled cordsets.

Modicon M340 automation platform
Discrete I/O modules

Run		Err		I/O		+32	
0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31

Display block for module BMX DDO 6402K

Functions *(1)*

The discrete I/O modules provide the following functions:

■ **Hot swapping**: Due to their special integrated devices, I/O modules (including application-specific modules) can be removed or added while the power is on.

■ **I/O assignment**: The channels of discrete I/O modules are grouped into blocks of 4, 8 or 16 consecutive channels depending on the type of module. Each group of channels can be assigned to a specific application task, namely master or fast.

■ **Protection of DC inputs**: The 24 V ⎓ and 48 V ⎓ inputs are constant-current type. This characteristic ensures and limits the current consumed at the inputs.

■ **Protection of DC outputs**: All active transistor outputs are protected against overload, short-circuits, reverse polarity and inductive over-voltage.

■ **Reactivation of DC outputs**: If a fault has caused an output to trip, the output can be reactivated using this parameter if no other terminal fault is present. Reactivation is controlled by means of a group of 8 channels. It can be programmed or automatic.

■ **RUN/STOP** command: An input can be configured to control the RUN/STOP changeover for the PLC.

■ **Output fallback**: This parameter defines the fallback mode used by the DC transistor outputs when the PLC stops. It can assume the “fallback” value at state 0 or state 1 for the corresponding group of 8 channels or the “maintain” value representing the state of the outputs before the PLC stops.

■ **I/O module diagnostics**: Each discrete I/O module is equipped with a display block on the front panel centralizing all the information necessary for module control, diagnostics and maintenance.

Diagnostics via Unity Pro:
Using the integrated diagnostics in Unity Pro, this local diagnostics on the module front panel is complemented by system diagnostics based on predefined screens at global hardware configuration level, module level and channel level (see page 4/4).

Remote diagnostics using a web browser on a “Thin Client” PC:
In addition, the diagnostics described above can be performed remotely using a simple web browser thanks to the standard web server integrated in the Modicon M340 platform (processor with integrated Ethernet port or Ethernet module), using the “ready-to-use” Rack Viewer function (see page 3/14).

■ **Compatibility with 2-wire and 3-wire sensors**: The discrete input modules can be used in conjunction with OsiSense XS inductive proximity sensors (for compatibility, see page 7/10) and with OsiSense XU photo-electric sensors (for compatibility, see page 7/8).

(1) For further information, please consult our website at www.schneider-electric.com

Modicon M340 automation platform
Discrete I/O modules

Complementary characteristics

The following characteristics complement those introduced in the selection guide on pages 2/2 to 2/7.

DC input modules BMX DDI 16●●/1604T/3202K/6402K and BMX DAI 1602

- Input impedance at nominal voltage: 6.4 to 19.2 kΩ, depending on model
- Reverse polarity: Protection for modules BMX DDI 1602/1603/3202K
- Paralleling of inputs *(1)*: Yes, for modules BMX DDI 1602/1603
- Dielectric strength between group of channels: 500 V ⎓ for modules BMX DDI 3202K/6402K
- Temperature derating for module BMX DDI 1604T: No derating up to 40°C, a maximum of 25% of inputs at state 1 at 70°C

AC input modules BMX DAI 16●●/0805

- Input frequency: 47 to 63 Hz
- Current peak on activation at nominal voltage: 5 to 240 mA depending on model
- Input impedance at nominal voltage and F = 55 Hz: 6 to 21 kΩ, depending on model

Triac output modules BMX DAO 1605

- Current via common: 2.4 A
- Current for all 4 commons together: 4.8 A

DC transistor output modules BMX DDO 16●●/3202K/6402K

- Dielectric strength between groups of channels: 500 V ⎓ for modules BMX DDO 3202K/6402K

Relay output modules BMX DRA 080●●/1605

- Protection against AC inductive overvoltage: Use an RC circuit or ZNO surge limiter appropriate to the voltage in parallel on each output.
- Protection against DC inductive overvoltage: Use a discharge diode on each output.

Mixed I/O relay module BMX DDM 16025

- Input impedance at nominal voltage: 6.8 kΩ
- Dielectric strength between groups of inputs: 500 V ⎓

DC mixed I/O modules BMX DDM 16022/3202K

- Input impedance at nominal voltage: 6.8 to 9.6 kΩ, depending on model
- Reverse polarity on the inputs: Protection
- Paralleling of outputs: Yes, for a maximum of 2 outputs for module BMX DDI 16022 and a maximum of 3 outputs for module BMX DDI 3202K

(1) This characteristic allows several inputs to be wired in parallel on the same module or on different modules for input redundancy.

Modicon M340 automation platform

Discrete I/O modules

Input modules and output modules

BMX DDI 160●●
BMX DAI ●●●●

BMX DDI 3202K

BMX DDI 6402K

References

Discrete input modules *(1)*

Type of current	Input voltage	Connection via *(2)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓	24 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMX DDI 1602**	0.115
		One 40-way connector	Type 3	32 isolated inputs (2 x 16)	**BMX DDI 3202K**	0.110
		Two 40-way connectors	Non-IEC	64 isolated inputs (4 x 16)	**BMX DDI 6402K**	0.145
	24 V (negative logic)	Screw or spring-type 20-way removable terminal block	Non-IEC	16 isolated inputs (1 x 16)	**BMX DAI 1602**	0.115
	48 V (positive logic)	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMX DDI 1603**	0.115
	125 V (positive logic)	Screw or spring-type 20-way removable terminal block		16 isolated inputs (1 x 16)	**BMX DDI 1604T**	0.144
∼	24 V	Screw or spring-type 20-way removable terminal block	Type 1	16 isolated inputs (1 x 16)	**BMX DAI 1602**	0.115
	48 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMX DAI 1603**	0.115
	100…120 V	Screw or spring-type 20-way removable terminal block	Type 3	16 isolated inputs (1 x 16)	**BMX DAI 1604**	0.115
	200…240 V	Screw or spring-type 20-way removable terminal block	Type 2	8 isolated inputs (1 x 8)	**BMX DAI 0805**	0.152

BMX DDO 16●2

BMX DRA 0805/1605

BMX DDO 3202K

BMX DDO 6402K

Discrete output modules *(1)*

Type of current	Output voltage	Connection via *(2)*	IEC/EN 61131-2 conformity	No. of channels (common)	Reference	Weight kg
⎓ **transistor**	24 V/0.5 A (positive logic)	20-way removable terminal block, screw or spring-type	Yes	16 protected outputs (1 x 16)	**BMX DDO 1602**	0.120
	24 V/0.5 A (negative logic)	20-way removable terminal block, screw or spring-type	–	16 protected outputs (1 x 16)	**BMX DDO 1612**	0.120
	24 V/0.1 A (positive logic)	One 40-way connector	Yes	32 protected outputs (2 x 16)	**BMX DDO 3202K**	0.110
		Two 40-way connectors	Yes	64 protected outputs (4 x 16)	**BMX DDO 6402K**	0.150
∼ **triac**	100…240	20-way removable terminal block, screw or spring-type	–	16 outputs (4 x 4)	**BMX DAO 1605**	0.140
⎓ **relay**	100…150 V ⎓/ 0.3 A	20-way removable terminal block, screw or spring-type	Yes	8 non-protected outputs	**BMX DRA 0804T**	0.178
⎓ **or** ∼ **relay**	24 V ⎓/2 A 24…240 V ∼/ 2 A	20-way removable terminal block, screw or spring-type	Yes	8 non-protected outputs (without common)	**BMX DRA 0805**	0.145
		20-way removable terminal block, screw or spring-type	Yes	16 non-protected outputs (2 x 8)	**BMX DRA 1605**	0.150

(1) Typical consumption: See the power consumption table on page 7/16.
(2) 64-channel modules have 2 connectors and therefore require 2 connection cables.

Processors: page 1/2 | Communication: page 3/2 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Discrete I/O modules

Mixed I/O modules, accessories

BMX DDM 1602●

BMX DDM 3202K

References (continued)

Discrete mixed I/O modules *(1)*

Number of I/O	Connection	No. of input channels (common)	No. of output channels (common)	IEC/EN 61131-2 conformity	Reference	Weight kg
16	Screw or spring-type 20-way removable terminal block	8 (positive logic) (1 x 8)	8, transistor 24 V c/0.5 A (1 x 8)	Inputs, type 3	**BMX DDM 16022**	0.115
			8, relay 24 V ⎓ or 24…240 V ∿ (1 x 8)	Inputs, type 3	**BMX DDM 16025**	0.135
32	One 40-way connector	16 (positive logic) (1 x 16)	16, transistor 24 V ⎓/0.1 A (1 x 16)	Inputs, type 3	**BMX DDM 3202K**	0.110

BMX FTB 2000

Removable terminal blocks

Description	For use with	Type	Reference	Weight kg
20-way removable terminal blocks	For module with 20-way removable terminal block	Cage clamp	**BMX FTB 2000**	0.093
		Screw clamp	**BMX FTB 2010**	0.075
		Spring	**BMX FTB 2020**	0.060

Preassembled cordsets for 16-channel I/O modules with removable terminal block

Description	Composition	Cross-section	Length	Reference	Weight kg
Preassembled cordsets with one end with flying leads for 16-channel I/O modules Operating voltage ≤ 48 V	One 20-way spring-type removable terminal block (BMX FTB 2020) and one end with colour-coded flying leads	0.324 mm²	3 m	**BMX FTW 301**	0.850
			5 m	**BMX FTW 501**	1.400
			10 m	**BMX FTW 1001**	2.780

BMX FTW ●01

Preassembled cordsets for 16, 32 and 64-channel I/O modules with 40-way connectors

Description	No. of sheaths	Composition	Cross-section	Length	Reference	Weight kg
Preassembled cordsets with one end with flying leads	1 x 20 wires (16 channels)	One 40-way connector and one end with colour-coded flying leads	0.324 mm²	3 m	**BMX FCW 301**	0.820
				5 m	**BMX FCW 501**	1.370
				10 m	**BMX FCW 1001**	2.770
	2 x 20 wires (32 channels) *(2)*	One 40-way connector and two ends with colour-coded flying leads	0.324 mm²	3 m	**BMX FCW 303**	0.900
				5 m	**BMX FCW 503**	1.490
				10 m	**BMX FCW 1003**	2.960
Preassembled cordsets for Modicon Telefast ABE 7 sub-bases	1 x 20 wires (16 channels)	One 40-way connector and one HE 10 connector	0.324 mm²	0.5 m	**BMX FCC 051**	0.140
				1 m	**BMX FCC 101**	0.195
				2 m	**BMX FCC 201**	0.560
				3 m	**BMX FCC 301**	0.840
				5 m	**BMX FCC 501**	1.390
				10 m	**BMX FCC 1001**	2.780
	2 x 20 wires (32 channels) *(2)*	One 40-way connector and two HE 10 connectors	0.324 mm²	0.5 m	**BMX FCC 053**	0.210
				1 m	**BMX FCC 103**	0.350
				2 m	**BMX FCC 203**	0.630
				3 m	**BMX FCC 303**	0.940
				5 m	**BMX FCC 503**	1.530
				10 m	**BMX FCC 1003**	3.000

BMX FCW ●01

BMX FCW ●03

BMX FCC ●01

(1) Typical consumption: See the power consumption table on page 7/16.
(2) 64-channel modules have 2 connectors and therefore require 2 connection cables.

Modicon M340 automation platform

Analog I/O modules

Input modules

Applications		Analog inputs	
Type of input		Isolated low-level inputs, voltage, thermocouples, temperature probes, resistors	
Type		Multirange	
Range	Voltage	± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V	
	Current	–	
	Thermocouple Temperature probe Resistor	Thermocouples, type B, E, J, K, L, N, R, S, T, U 2, 3 or 4-wire temperature probes, type Pt100, JPt100, Pt1000, JPt1000, Ni100, Ni1000 (in accordance with DIN 43760) and Cu 10 2, 3 or 4-wire resistors, 400 Ω or 4000 Ω	
Modularity		4 inputs	8 inputs
Acquisition period		400 ms for the 4 inputs	400 ms for the 8 inputs
Conversion time		–	
Resolution		15 bits + sign	
Isolation	Between channels	750 V⎓	
	Between channels and bus	1400 V⎓	
	Between channels and earth	750 V⎓	
Connection	Directly to the module	Via 40-way connector	Via two 40-way connectors
	Via preassembled cordsets	Cordsets with one end with colour-coded flying leads BMX FCW ●01S (3 or 5 m long)	
Compatibility with pre-wired system Modicon Telefast ABE7	Connection sub-base	4-channel sub-base for direct connection of 4 thermocouples plus connection and provision of cold junction compensation. See page 5/8	
	Type of connection sub-base	ABE 7CPA412	
	Type of preassembled cordsets	BMX FCA ●●2 (1.5, 3 or 5 m long)	
References		**BMX ART 0414**	**BMX ART 0814**
Page		2/22	

Analog inputs

Isolated high-level inputs	Non-isolated high-level inputs	Isolated high-level inputs
Voltage/current		
± 10 V, 0…10 V, 0...5 V, 1..5 V, ± 5 V		
0...20 mA, 4…20 mA, ± 20 mA		
–		
4 inputs	8 inputs	
Fast: 1 + (1 x no. of declared channels) ms Default: 5 ms for the 4 channels	Fast: 1 + (1 x no. of declared channels) ms Default: 9 ms for the 8 channels	
–		
16 bits	15 bits + sign	
300 V⎓	–	300 V⎓
1400 V⎓		
1400 V⎓		
Via 20-way removable terminal block (screw or spring-type) BMX FTB 20●0	Via 28-way removable terminal block (spring-type) BMX FTB 2820	
Cordsets with one end with colour-coded flying leads BMX FTW ●01S (3 or 5 m long)	Cordsets with one end with colour-coded flying leads BMX FTW ●08S (3 or 5 m long)	
4-channel sub-base for direct connection of 4 inputs, delivers and distributes 4 protected isolated power supplies. See page 5/8	8-channel sub-base for direct connection of 8 current/voltage inputs. See page 5/8	
ABE 7CPA410	ABE 7CPA02/03/31/31E	ABE 7CPA02/31/31E
BMX FCA ●●0 (1.5, 3 or 5 m long)	BMX FTA ●●0 (1.5 or 3 m long)	
BMX AMI 0410	**BMX AMI 0800**	**BMX AMI 0810**
2/22		

Modicon M340 automation platform

Analog I/O modules

Output modules and mixed I/O modules

2

Applications		Analog Outputs		
Type of I/O		Isolated high-level outputs	Isolated high-level outputs	High-level outputs non-isolated
Type		Voltage/current		Current
Range	Voltage	± 10 V		–
	Current	0...20 mA, 4...20 mA		
Modularity		2 outputs	4 outputs	8 outputs
Acquisition period (inputs)		–		
Conversion time (outputs)		⩽ 1 ms		⩽ 4 ms
Resolution	Inputs	–		
	Outputs	15 bits + sign		
Isolation		Between channels: 750 V ⎓		
		Between channels and bus: 1400 V ⎓		
		Between channels and earth: 1400 V ⎓		
Connection	Directly to the module	Via 20-way removable terminal block (screw or spring-type) BMX FTB 20●0		
	Via preassembled cordsets	Cordsets with one end with colour-coded flying leads BMX FTW ●01S (3 or 5 m long)		
Compatibility with pre-wired system Modicon Telefast ABE7	Connection sub-base	4-channel sub-base for direct connection of 2/4 current/voltage outputs. See page 5/8		8-channel sub-base for direct connection of 8 current/voltage inputs. See page 5/8
	Type of connection sub-base	ABE 7CPA21		ABE 7CPA02
	Type of preassembled cordsets	BMX FCA ●●0 (1.5, 3 or 5 m long)		BMX FTA ●●2 (1.5 or 3 m long)
References		**BMX AMO 0210**	**BMX AMO 0410**	**BMX AMO 0802**
Page		2/22		

Mixed analog I/O

Non-isolated high-level inputs and outputs
Voltage/current
Inputs: ± 10 V, 0…10 V, 0...5 V, 1..5 V Outputs: ± 10 V
Inputs: 0...20 mA, 4…20 mA Outputs: 0...20 mA, 4…20 mA
4 inputs and 2 outputs
Fast: 1 + (1 x no. of declared channels) ms Default: 5 ms for the 4 channels
⩽ 1 ms
14…12-bit in U range 12-bit in I range
12-bit in U range 11-bit in I range
Between groups of input or output channels: 750 V ⎓
Between channels and bus: 1400 V ⎓
Between channels and earth: 1400 V ⎓
Via 20-way removable terminal block (screw or spring-type) BMX FTB 20●0
BMX FTW ●01S cordsets with one end with colour-coded flying leads (3 or 5 m long)
–
–
–

BMX AMM 0600

2/22

Modicon M340 automation platform
Analog I/O modules

Presentation

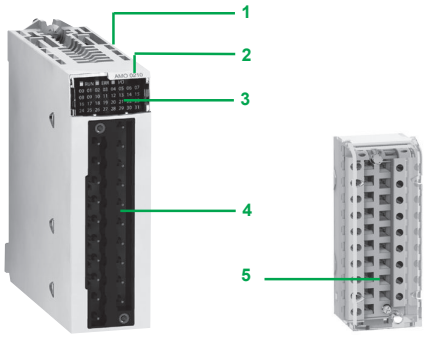
The Modicon M340 analog I/O module offer comprises:
- ■ 5 analog input modules:
  - □ 2 modules with 4 and 8 isolated channels, low-level voltage, thermocouples, Pt, JPt, Ni or Cu temperature probes and resistors, 15 bits + sign **BMX ART 0414/0814**
  - □ 1 module with 4 high-speed isolated analog channels, high-level voltage or current, 16 bits **BMX AMI 0410**
  - □ 2 modules with 8 high-speed non-isolated analog channels, high-level voltage or current, 15 bits + sign **BMX AMI 0800/0810**
- ■ 3 analog output modules:
  - □ 1 module with 2 isolated analog channels, high-level voltage or current, 15 bits + sign **BMX AMO 0210**
  - □ 1 module with 4 isolated analog channels, high-level voltage or current, 15 bits + sign **BMX AMO 0410**
  - □ 1 module with 8 non-isolated analog channels, high-level current, 15 bits + sign **BMX AMO 0802**
- ■ 1 mixed analog I/O module with 4 input channels and 2 output channels (non-isolated), voltage or current, 12 to 14 bits according to type of channel and range **BMX AMM 0600**

Analog I/O modules are equipped with a connector for a 20 or 28-way removable terminal block, except for **BMX ART 0414/0814** analog input modules for thermocouples/temperature probes, which are equipped with one or two 40-way connector(s).

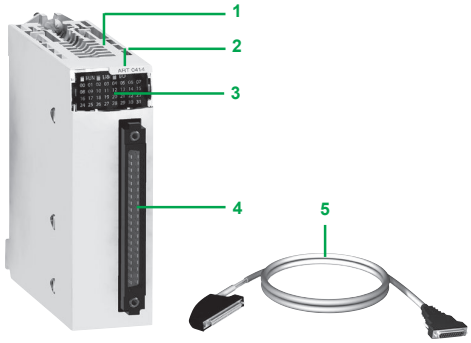
All analog modules occupy a single slot in **BMX XBP ●●●** racks. These modules can be installed in any slot in the rack, except the first two (PS and 00) which are reserved for the power supply module in the **BMX CPS●●0** rack and the **BMX P34●●0** processor module respectively.

The power supply for the analog functions is supplied by the backplane bus (3.3 V and 24 V). Analog I/O modules are hot-swappable (see page 2/10).

Modicon M340 automation platform
Analog I/O modules



Module for connection via 20 or 28-way removable terminal block



Module for connection for 40-way connector

Description

BMX AM●/ART analog I/O modules are standard format (1 slot). They have a case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

I/O modules connected via 20 or 28-way removable terminal block

BMX AM● analog I/O modules feature the following:

1 A rigid body providing support and protection for the electronic card
2 A module reference marking (a label is also visible on the right-hand side of the module)
3 A module and channel status display block
4 A connector taking the 20 or 28-way removable screw or spring-type terminal block for directly connecting the sensors or preactuators to the module.

To be ordered separately:

5 A **BMX FTB 20●0** or **BMX FTB 2820** 20 or 28-way removable terminal block (referencing label supplied with each I/O module) or pre-wired cables with:
- A 20-way terminal block at one end and flying leads at the other (**BMX FTW ●01S)**
- A 28-way terminal block at one end and flying leads at the other (**BMX FTW ●08S)**
- A 20 or 28-way terminal block and a 25-way SUB-D connector (**BMX FCA ●●0** or **BMX FTA ●●0**), for connection to Modicon Telefast ABE 7 sub-bases (see page 2/23).

I/O modules connected via 40-way connector

BMX ART analog input modules have the following on the front panel:

1 A rigid body providing support and protection for the electronic card
2 A module reference marking (a label is also visible on the right-hand side of the module)
3 A module and channel status display block
4 One (or two) 40-way connector(s) for connecting the sensors

To be ordered separately:

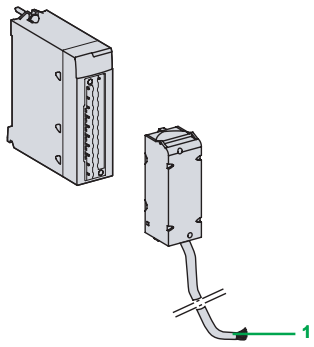
5 Pre-wired cables with:
- A 40-way connector at one end and flying leads at the other **BMX FCW ●01S**
- A 40-way connector and a 25-way SUB-D connector (**BMX FCA ●●2**) for direct connection to the Modicon Telefast ABE 7 sub-bases (see page 2/23)

Must be ordered separately:

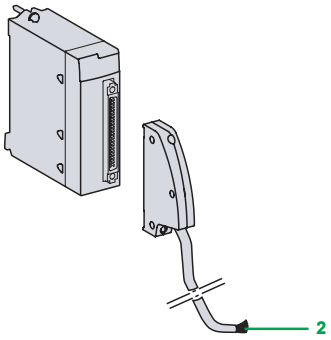
■ A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack supporting the analog modules

■ A set of **STB XSP 3020** clamping rings for the shielding braids of analog signal cables

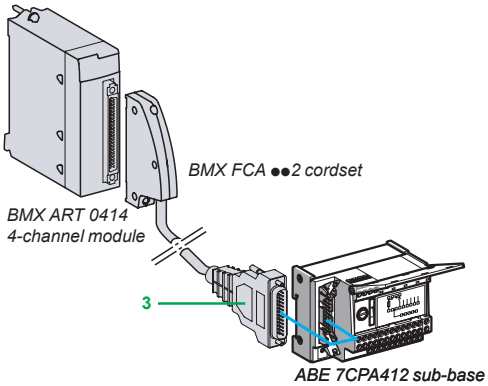
Modicon M340 automation platform
Analog I/O modules



BMX FTW ●01S cordset
(with 20-way removable terminal block at one end and flying leads at the other)



BMX FCW ●01S cordset
(with 40-way connector at one end and flying leads at the other)



Connecting modules with removable terminal blocks

BMX AMI 0410, BMX AMO and BMX AMM modules with 20-way terminal block

The 20-way removable terminal blocks (**BMX FTB 20●0**) are the same as those used for discrete I/O modules (screw clamp, cage clamp or spring-type) (see page 2/9).

One version of the removable terminal block is equipped with a 3 or 5 m cordset with colour-coded flying leads (**BMX FTW ●01S**). These preassembled cordsets with reinforced shielding have colour-coded flying leads at the other end **1**.

BMX AMI 0800/0810 modules with 28-way terminal block

The 28-way removable terminal blocks (**BMX FTB 2820**) are spring-type.

One version of the removable terminal block is equipped with a 3 or 5 m cordset with colour-coded flying leads (**BMX FTW ●08S**). These preassembled cordsets with reinforced shielding have colour-coded flying leads at the other end **1**.

Connecting modules with 40-way connectors

BMX ART 0●14 modules with 40-way connectors

Two types of cordset are available:

- Preassembled cordsets with reinforced shielding (**BMX FCW ●01S**) which have colour-coded flying leads at the other end **2**. Available in 3 or 5 m lengths, they enable easy direct wire-to-wire connection of the analog sensors via terminal blocks.
- Preassembled cordsets with reinforced shielding (**BMX FCA ●02**) which have a 25-way SUB-D connector at the other end **3**. Available in 1.5, 3 or 5 m lengths, they enable direct connection to the Modicon Telefast **ABE 7CPA412** sub-base (see below).

Use with Modicon Telefast ABE 7 sub-bases

Using the Modicon Telefast ABE 7 pre-wired system makes it easier to install the modules since the inputs (or outputs) can be accessed via screw terminals. 7 special sub-bases are available:

Modicon Telefast ABE 7CPA410 sub-base

The Modicon Telefast **ABE 7CPA410** sub-base is mainly used in conjunction with the **BMX AMI 0410** voltage/current analog 4-input module. This sub-base allows you to:

- Directly connect 4 sensors
- Remotely locate the input terminals in voltage mode
- Power the 4 to 20 mA conditioning units one channel at a time with a 24 V voltage, protected and limited to 25 mA, while maintaining isolation between channels
- Protect the current impedance matching resistors integrated in the sub-base against overvoltages

Connection is via the **BMX FCA ●●0** cordset (1.5, 3 or 5 m long).

Modicon Telefast ABE 7CPA412 sub-base

The Modicon Telefast **ABE 7CPA412** sub-base is specially designed as a wiring interface for the **BMX ART 0414** and **BMX ART 0814** thermocouple modules. This sub-base allows you to:

- Connect 4 thermocouple probes
- Provide external cold junction compensation with a temperature probe integrated in the sub-base
- Ensure continuity of the shielding

The **BMX ART 0814** module requires two Modicon Telefast **ABE 7CPA412** sub-bases. The connection with each sub-base is made via a **BMX FCA ●●2** cordset (1.5, 3 or 5 m long).

Modicon Telefast ABE 7CPA21 sub-base

The Modicon Telefast **ABE 7CPA21** sub-base is compatible with the **BMX AMO 0210** output module. This sub-base allows you to:

- Directly connect 2 current/voltage outputs
- Ensure continuity of the shielding

Connection is via the **BMX FCA ●●0 3** cordset (1.5, 3 or 5 m long).

Use with Modicon Telefast ABE 7 sub-bases (continued)

Modicon Telefast ABE 7CPA02 sub-base

The Modicon Telefast **ABE 7CPA02** sub-base can be used in combination with:
- The **BMX AMI 0800/0810** analog current input modules with 8 inputs
- The **BMX AMO 0802** analog current output modules with 8 outputs

This sub-base allows you to:
- Connect the 8 analog inputs or outputs point-to-point
- Ensure continuity of the shielding

The **BMX AMI 0800/0810** modules are connected by means of the 1.5 or 3 m long **BMX FTA ●●0** cables.

The **BMX AMO 0802** module is connected by means of the 1.5, 3 or 5 m long **BMX FTA ●●2** cables.

Modicon Telefast ABE 7CPA03 sub-base

The Modicon Telefast **ABE 7CPA03** sub-base can be used in combination with the **BMX AMI 0800** voltage/current analog 8-input module.

This sub-base allows you to:
- Directly connect 8 analog inputs
- Power the current inputs one channel at a time with a voltage of 24 V that is protected and limited to 25 mA
- Ensure continuity of the shielding

The **BMX AMI 0800** module is connected by means of the 1.5 or 3 m long **BMX FTA ●●0** cables.

Modicon Telefast ABE 7CPA31/31E sub-bases

The Modicon Telefast **ABE 7CPA31/31E** sub-bases can be used in combination with the **BMX AMI 0800/0810** voltage/current analog 8-input modules.

This sub-base allows you to:
- Directly connect 8 analog inputs
- Power the current inputs one channel at a time with 24 V converters
- Ensure continuity of the shielding

The **BMX AMI 0800/0810** modules are connected by means of the 1.5 or 3 m long **BMX FTA ●●0** cables.

Complementary characteristics

BMX ART 0414/0814 analog input modules

BMX ART 0414/0814 modules are multirange input modules with 4 or 8 low-level isolated inputs (15 bits + sign) respectively.

Depending on the choice made during configuration, the modules offer, for each of the inputs, the following ranges:
- Temperature probe: Pt100, JPt100, Pt1000, JPt1000, Cu10, Ni100 or Ni1000 (in accordance with DIN43760), with open-circuit detection
- Thermocouple: B, E, J, K, L, N, R, S, T or U with broken wire detection
- Resistor: 0…400 or 0…4000 Ω, 2, 3 or 4-wire
- Voltage: ± 40 mV, ± 80 mV, ± 160 mV, ± 320 mV, ± 640 mV, ± 1.28 V

BMX AMI 0410 analog input modules

The **BMX AMI 0410** module is a high-level analog input module with 4 isolated inputs (16 bits).

Used with sensors or transmitters, it performs monitoring, measurement and process control functions for continuous processes.

The module offers the following ranges for each of the inputs depending on the choice made during configuration:
- Voltage ± 10 V, ± 5 V, 0…10 V, 0…5 V and 1…5 V
- Current 0…20 mA, 4…20 mA and ± 20 mA, depending on the choice made during configuration

BMX AMI 0800/0810 analog input modules

The **BMX AMI 0800/0810** analog input modules are
modules with 8 high-level isolated/non-isolated analog inputs (15 bits + sign).

The modules offer the following ranges for each of the inputs depending on the choice made during configuration:
- Voltage: ± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V
- Current: 0…20 mA and 4…20 mA

2

Complementary characteristics

BMX AMO 0210 analog output module

The **BMX AMO 0210** module is a module with 2 high-level isolated outputs (0.15 bits + sign).

The **BMX AMO 0210** module offers the following ranges for each of the inputs depending on the choice made during configuration:

- Voltage: ± 10 V
- Current: 0…20 mA and 4…20 mA

BMX AMO 0410/0802 analog output modules

The **BMX AMO 0410/0802** analog output modules are modules with 4 or 8 high-level isolated/non-isolated analog outputs (16 bits/15 bits + sign).

The **BMX AMO 0410** module offers the following ranges for each of the outputs depending on the choice made during configuration:

- Voltage: ± 10 V
- Current: 0…20 mA and 4…20 mA

The **BMX AMO 0802** module offers the current ranges 0…20 mA and 4…20 mA.

BMX AMM 0600 analog mixed I/O module

The **BMX AMM 0600** mixed module is a non-isolated I/O module with 4 inputs (14/12) bits and 2 outputs (12 bits).

The module offers the following ranges for each of the inputs or outputs depending on the choice made during configuration:

- Voltage: ± 10 V, 0…10 V, 0…5 V and 1…5 V
- Current: 0…20 mA and 4…20 mA

References

BMX AM● 0●●0

BMX ART 0414

Analog input modules *(1)*

Type of input	Input signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level inputs	± 10 V, 0…10 V, 0…5 V, 1…5 V, ± 5 V, 0…20 mA, 4…20 mA, ± 20 mA	16 bits	Removable terminal block, 20-way cage clamp, screw clamp or spring-type	4 channels	**BMX AMI 0410**	0.143
High-level inputs non-isolated	± 10 **V, 0…10 V,** 0…5 **V, 1…5 V,** ± 5 **V, 0…20 mA**	15 bits + sign	Removable terminal block, 28-way, spring-type	8 channels	**BMX AMI 0800**	0.175
Isolated high-level inputs	± 10 **V, 0…10 V,** 0…5 **V, 1…5 V, ±** 5 **V, 0…20 mA,**	15 bits + sign	Removable terminal block, 28 way, spring-type	8 channels	**BMX AMI 0810**	0.175
Isolated low-level inputs	Temperature probe, thermocouple, ± 40 **mV, ± 80 mV,** ± 160 **mV, ± 320 mV,** ± 640 **mV, ± 1.28 V**	15 bits + sign	40-way connector	4 channels	**BMX ART 0414**	0.135
				8 channels	**BMX ART 0814**	0.165

Analog output modules *(1)*

Type of outputs	Output signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Isolated high-level outputs	± 10 V, 0…20 mA, 4…20 mA	16 bits	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	2 channels	**BMX AMO 0210**	0.144
High-level outputs isolated	± 10 V, 0…20 mA, 4…20 mA, ± 20 mA	15 bits + sign	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	4 channels	**BMX AMO 0410**	0.175
High-level outputs non-isolated	0…20 mA, 4…20 mA	15 bits + sign	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	8 channels	**BMX AMO 0802**	0.175

Analog mixed I/O module *(1)*

Type of I/O	Signal range	Resolution	Connection	No. of channels	Reference	Weight kg
Mixed I/O, non-isolated	± 10 V, 0…10 V, 0…5 V, 1…5 V, 0…20 mA, 4…20 mA	14 bits or 12 bits depending on the range	Removable terminal block, 20-way, cage clamp, screw clamp or spring-type	Inputs: 4 channels Outputs: 2 channels	**BMX AMM 0600**	0.155

(1) Typical consumption: See the power consumption table on page 7/16.

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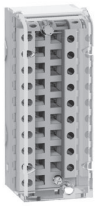
Modicon M340 automation platform
Analog I/O modules
Accessories



BMX FTB 20●0

BMX FTW ●01S

ABE 7CPA41●/21

BMX FCA ●●0

BMX FCA ●●2

References (continued)

Connection accessories for analog modules *(1)*

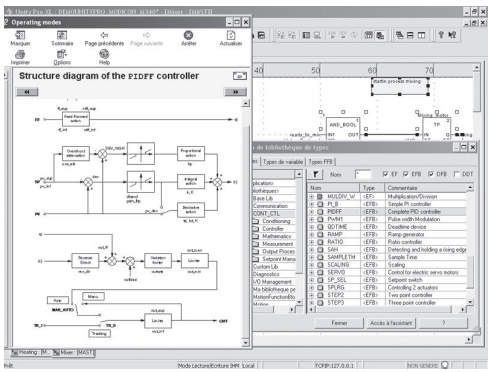
Description	For use with modules	Type, composition	Length	Reference	Weight kg
20-way removable terminal blocks	BMX AMI 0410 BMX AMO 0210 MX AMO 0410 MX AMO 0802 BMX AMM 0600	Cage clamp	–	**BMX FTB 2000**	0.093
		Screw clamp	–	**BMX FTB 2010**	0.075
		Spring	–	**BMX FTB 2020**	0.060
28-way removable terminal block	BMX AMI 0800 BMX AMI 0810	Spring	–	**BMX FTB 2820**	0.080
Preassembled cordsets	BMX AMI 0410 BMX AMO 0210 MX AMO 0410 MX AMO 0802 BMX AMM 0600	One 20-way terminal block (BMX FTB 2020) and one end with colour-coded flying leads	3 m	**BMX FTW 301S**	0.470
			5 m	**BMX FTW 501S**	0.700
	BMX AMI 0800 BMX AMI 0810	1 removable terminal block, 28-way, MX FTB 2820, and one end with colour-coded flying leads	3 m	**BMX FTW 308S**	0.435
			5 m	**BMX FTW 508S**	0.750
	BMX ART 0414 BMX ART 0814	One 40-way connector and one end with colour-coded flying leads	3 m	**BMX FCW 301S**	0.480
			5 m	**BMX FCW 501S**	0.710

Modicon Telefast ABE 7 pre-wired system

Description	For use with modules	Type, composition	Length or connection technology	Reference	Weight kg
Modicon Telefast ABE 7 sub-bases	BMX AMI 0410	Distribution of isolated power supplies Delivers 4 protected isolated power supplies for 4…20 mA inputs. Direct connection of 4 inputs	Screws	**ABE 7CPA410**	0.180
	BMX ART 0414 BMX ART 0814 *(2)*	Connection and provision of cold-junction compensation for thermocouples Direct connection of 4 inputs	Screws	**ABE 7CPA412**	0.180
	BMX AMO 0210 BMX AMO 0410	Direct connection of 2/4 outputs	Screws	**ABE 7CPA21**	0.210
	BMX AMI 0800 BMX AMI 0810 BMX AMO 0802	Point-to-point connection of 8 I/O	Screws	**ABE 7CPA02**	0.317
	BMX AMI 0800	Direct connection of 8 inputs Delivers 8x 24 V ⎓ power supplies limited to 25 mA to the 8 current inputs	Screws	**ABE 7CPA03**	0.307
	BMX AMI 0800 BMX AMI 0810	Direct connection of 8 inputs Delivers 8x 24 V ⎓ power supplies isolated and limited to 25 mA to the 8 current inputs	Screws	**ABE 7CPA31**	0.498
			Spring	**ABE 7CPA31E**	0.508
Preassembled cordsets for Modicon Telefast ABE 7 sub-bases	BMX AMI 0410 BMX AMO 0210 BMX AMO 0410	One 20-way removable terminal block and one 25-way SUB-D connector for ABE 7CPA410/ CPA21 sub-base	1.5 m	**BMX FCA150**	0.320
			3 m	**BMX FCA300**	0.500
			5 m	**BMX FCA500**	0.730
	BMX ART 0414 BMX ART 0814 *(2)*	One 40-way connector and one 25-way SUB-D connector for ABE 7CPA412 sub-base	1.5 m	**BMX FCA152**	0.330
			3 m	**BMX FCA302**	0.510
			5 m	**BMX FCA502**	0.740
	BMX AMI 0800 BMX AMI 0810	One 28-way removable terminal block and one 25-way SUB-D connector for sub-bases ABE 7CPA02/03/31/31E	1.5 m	**BMX FTA 150**	0.374
			3 m	**BMX FTA 300**	0.500
	BMX AMO 0802	One 20-way removable terminal block and one 25-way SUB-D connector for ABE 7CPA02 sub-bases	1.5 m	**BMX FTA 152**	0.374
			3 m	**BMX FTA 302**	0.500

*(1) The shielding on the cordsets carrying the analog signals must always be connected to the **BMX XSP●●00** shielding connection kit mounted under the rack holding the analog modules (see page 1/11).*
*(2) The **BMX ART 0814** 8-channel module requires two **ABE 7CPA412** sub-bases and two **BMX FCA●●2** cordsets.*

Modicon M340 automation platform
Programmable process control
Unity Pro software



CONT_CTL, programmable process control integrated in Unity Pro

Process control in machines

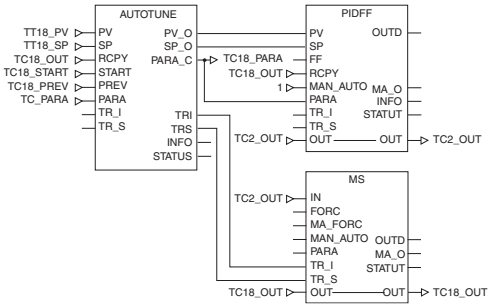
Unity Pro contains CONT_CTL, a library of 36 function blocks used to create control loops for machine control.

All requirements for closed loop control functions in machines are adequately met by Modicon M340 thanks to the wealth of functions in the library and the flexibility with which function blocks can be linked together through programming. This solution therefore eliminates the need for external controllers and simplifies the overall control architecture of the machine, as well as its design, roll-out and operation.

The function blocks, EF or EFB, can be used in all Unity Pro languages i.e. LD, ST, IL and FBD. FBD is particularly suitable for accessing control processing operations in Unity Pro through its assistant for entering and viewing parameters and function block variables.

CONT_CTL library functions

The library consists of five function families:
- Input data conditioning
- Controllers
- Mathematical functions
- Measurement processing
- Output value processing



Example: PID controller with MS manual control

Input data conditioning	
DTIME	Pure delay time
INTEGRATOR	Integrator with limiting
LAG_FILTER	First order time lag
LDLG	Lead/lag function with smoothing
LEAD	Lead function with smoothing
MFLOW	Mass flow calculation based on the measurement of differential pressure or flow speed with pressure and temperature compensation
QDTIME	Dead time term
SCALING	Scaling
TOTALIZER	Integrator (typically of flow) until a limit (typically a volume) is reached, with automatic reset
VEL_LIM	Velocity limiter, with manipulated variable limiting

Controllers	
PI_B	Basic PI controller: PI algorithm with a mixed structure (series/parallel)
PIDFF	Complete PID controller: PID algorithm with a parallel or mixed structure (series/parallel)
AUTOTUNE	Automatic tuner setting for the PIDFF (complete PID) controller or the PI_B (basic PI) controller □ Identification using Ziegler Nichols type method □ Modelling based on first order process □ Building of control parameters with criterion for prioritizing either the reaction time to disturbance (dynamic) or the stability of the process
IMC	Model-based controller The model is a first order model with delay. This controller is useful: □ When there are serious delays compared with the main time constant of the process; this scenario cannot be satisfactorily resolved by standard PID process control □ For regulating a non-linear process IMC can handle any stable and aperiodic process of any order
SAMPLETM	Control of controller startup and sampling
STEP2	Simple two-position controller
STEP3	Three-position controller for temperature regulation

Mathematical functions	
COMP_DB	Comparison of two values, with dead zone and hysteresis
K_SQRT	Square root, with weighting and threshold, useful for linearization of flow measurements
MULDIV_W	Weighted multiplication/division of 3 numerical values
SUM_W	Weighted summation of 3 numerical values

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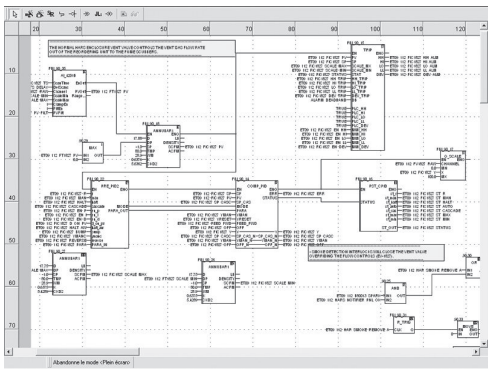


Programming in Unity Pro in offline mode

CONT_CTL library functions (continued)

Measurement processing

AVGMV	Moving average with fixed number of samples (50 max.)
AVGMV_K	Moving average with constant correction factor, 10,000 samples max.
DEAD_ZONE	Dead zone
LOOKUP_TABLE1	Linearization of characteristic curves using first order interpolation
SAH	Detection of a rising edge
HYST_XXX *(1)*	Detection of high threshold with hysteresis
INDLIM_XXX *(1)*	Detection of high and low thresholds with hysteresis

Output value processing

MS	Manual control of an output
MS_DB	Manual control of an output with dead zone
PWM1	Control via pulse width modulation
SERVO	Control for servo motors
SPLRG	Control of two Split Range actuators

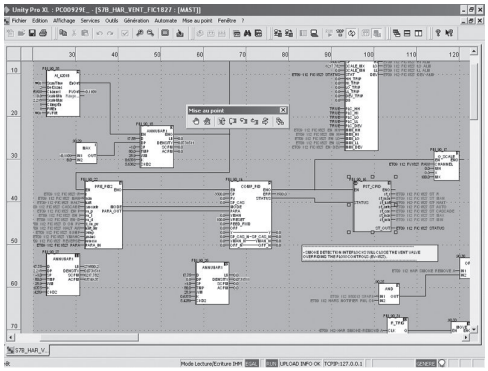
Setpoint management

RAMP	Ramp generator, with separate ascending and descending ramps
RATIO	Ratio controller
SP_SEL	Selection of setpoint value: local (operator) or *remote* (processing)

Setting-up

Setting up process control function blocks

Based on the sequencing of function blocks, the FBD language integrated in Unity Pro is a programming language particularly suitable for building control loops. Designers can use FBD to easily associate blocks from the CONT_CTL library with their own DFB blocks written in Unity Pro's ST, IL or LD language, or in C language.



Programming in online mode

Debugging, operation

All Unity Pro's standard debugging services (see page 4/4) are available.
In particular, the Modicon M340 processor simulator can be used to check correct execution of processing offline.

Compatibility

The CONT_CTL control function block library is available in all versions of Unity Pro. It is compatible with all processors in the Modicon M340, Premium, Quantum and Atrium ranges.

Resources

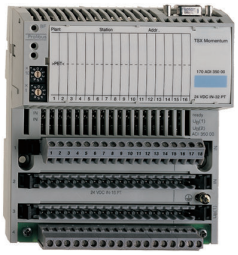
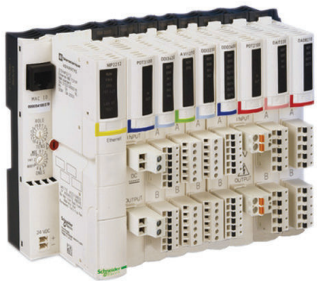
The technical documentation provides many examples of how to set up programmable process control function blocks in FBD, LD, IL and ST languages.

The techniques for adjusting process control loops are described in the document "Process control" available online at
www.schneider-electric.com

(1) XXX depending on the type of variable: DINT, INT, UINT, UDINT, REAL

Modicon M340 automation platform
Distributed I/O

Type of splitter box/module		Monobloc IP 67 I/O splitter boxes		
		Modicon FTB	Modicon ETB	Modicon FTM
Available buses and networks		CANopen	Ethernet Modbus TCP/IP EtherNet/IP	CANopen PROFIBUS DP DeviceNet
Max. number per connection point		1 monobloc splitter box		1 module with 1 monobloc splitter box
Discrete I/O	Modularity	Splitter box with 16 I, 8 I + 8 O, 12 I + 4 O, 16 I/O or 8 I + 8 I/O	Splitter box with 16 configurable I/O, 16 I, 12 I + 4 O, or 8 I + 8 O	8 I, 16 I, 8 configurable I/O, 16 configurable I/O,
	Input voltage	24 V ⎓		
	Output voltage	24 V ⎓		
Analog I/O		–		4 I/4 O
Application-specific I/O		–		
I/O connection		M12 connectors		M8 or M12 connectors, depending on models
Type of housing		Plastic and metal	Plastic	
Module type		FTB 1	ETB 1E●●●	FTM 1
Page		Please consult the catalogue pages on our website www.schneider-electric.com		

Monobloc IP 20 distributed I/O	Optimum IP 20 distributed I/O	Modular IP 20 distributed I/O
Modicon Momentum	**Modicon OTB**	**Modicon STB**
		
Ethernet Modbus TCP/IP Modbus Plus Fipio InterBus PROFIBUS DP DeviceNet	Ethernet Modbus TCP/IP CANopen Modbus (RS 485)	Ethernet Modbus TCP/IP EtherNet/IP CANopen Modbus Plus Fipio InterBus PROFIBUS DP DeviceNet
1 sub-base with 1 processor or 1 communication module	1 interface module + 7 Twido expansion modules	1 “NIM” (Network Interface Module) + 32 I/O modules
Sub-base with 16 I, 32 I, 8 O, 16 O, 32 O, 10 I/8 O, 16 I/8 O, 16 I/12 O or 16 I/16 O	12 I/8 O (interface module) 8 I, 16 I, 32 I, 8 O, 16 O, 32 O, 4 I/4 O and 16 I/8 O (expansion modules)	Module with 2 I, 4 I, 6 I, 16 I, 2 O, 4 O, 6 O or 16 O
24 V ⎓, 120 V ∿ and 230 V ∿	24 V ⎓	24 V ⎓, 115 V ∿ and 230 V ∿
24 V ⎓, 120 V ∿ and 230 V ∿ and relay	24 V ⎓ and relay	24 V ⎓, 115/230 V ∿ and relay
8 I, 16 I or 4 O (voltage/current) sub-bases Sub-base with 4 thermocouple or probe inputs	2 I, 4 I, 8 I, 1 O, 2 O, 2 I/1 O and 4 I/2 O (expansion modules) voltage/current, thermocouple or temperature probe	Modules with 2, 4 or 8 inputs and 1 or 2 outputs (voltage/current) Module with 2 thermocouple or probe inputs
10 kHz/200 kHz 2-channel counter sub-base	Integrated in interface module: - 2 x 5 kHz/20 kHz channels - 2 PWM function channels	Counter module with 1 x 40 kHz channel
6 I/3 O 120 V ∿ sub-base with 1 Modbus port	–	Parallel interface modules for TeSys Quickfit and TeSys U motor starters, integrated connection for third-party CANopen products
Screw or spring-type removable terminal blocks	Removable screw terminal block (interface module) Removable screw terminal block, non-removable spring-type terminal block and HE 10 connector (expansion modules)	Removable screw or spring-type connectors, Telefast connectors.
Plastic		
170 AD●	**OTB 1●0 DM9LP**	**STB ●●●**
Please consult the catalogue pages on our website **www.schneider-electric.com**		

Modicon M340 automation platform

BMX EHC 0200/0800 counter modules

Presentation

BMX EHC 0200 and **BMX EHC 0800** counter modules for the Modicon M340 automation platform are used to count the pulses generated by a sensor or to process the signals from an incremental encoder.

The two modules differ in their number of counter channels, maximum input frequencies, functions and auxiliary input and output interfaces:

Counter Module	No. of channels	Maximum frequency	Integrated functions	No. of physical inputs	No. of physical outputs
BMX EHC 0200	2	60 KHz	Upcounting Downcounting Period meter Frequency meter Frequency generator Axis control	6	2
BMX EHC 0800	8	10 KHz	Upcounting Downcounting Measurement	2	–

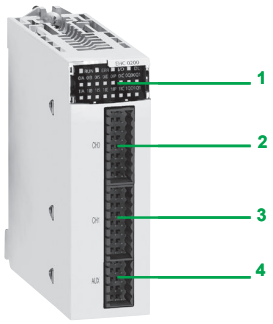
The sensors used on each channel can be:
- 2-wire 24 V proximity sensors
- 3-wire 24 V proximity sensors
- 10/30 V output signal incremental encoders with push-pull outputs

BMX EHC 0200/0800 counter modules can be used to meet the demands of applications such as:
- Alarm generation on empty unwinder status using the ratio
- Sorting small parts using the period meter
- Single electronic cam using the dynamic setting thresholds
- Speed control using the period meter

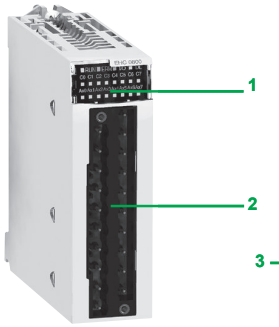
These standard format modules can be installed in any available slot of a Modicon M340 PLC. They are hot-swappable.

In a Modicon M340 PLC configuration, the number of **BMX EHC 0200/0800** counter modules should be added to the number of application-specific modules (communication).

The function parameters are set by configuration using the Unity Pro software.



BMX EHC 0200



BMX EHC 0800

BMX FTB 20●0

Description

BMX EHC 0200/0800 counter modules are standard format. They occupy a single slot in **BMX XBP ●●●** racks. They come in a plastic case, which ensures IP 20 protection of the electronics, and are locked into position by a captive screw.

BMX EHC 0200 module, 2 channels, 60 KHz

The front panel of the **BMX EHC 0200** counter module features:
1. Module and channel status display block
2. 16-way connector for connecting the sensors of counter 0
3. 16-way connector for connecting the sensors of counter 1
4. 10-way connector for connecting:
   - Auxiliary outputs
   - Sensor power supplies

To be ordered separately:
- **A BMX XTS HSC 20** kit containing two 16-pin connectors and one 10-pin connector
- A **BMX XSP ●●00** shielding connection kit if the rack is not already equipped with one (see page 1/11).

BMX EHC 0800 module, 8 channels, 10 KHz

The front panel of the **BMX EHC 0800** counter module features:
1. Module and channel status display block
2. Connector taking the 3 **BMX FTB 20●0** 20-way removable terminal block (same as that of I/O modules)

To be ordered separately:
- A 20-way removable terminal block 3 (cage clamp, screw clamp or spring-type) **BMX FTB 20●0**
- A **BMX XSP ●●00** shielding connection kit if the rack is not already equipped with one (see page 1/11).

Modicon M340 automation platform

BMX EHC 0200/0800 counter modules

Operating modes for module BMX EHC 0200

8 configurable modes	Frequency meter	This mode measures a frequency, speed, data rate or an event stream. As standard, this mode measures the frequency received on the IN A input. This frequency is always expressed in Hz (number of pulses/second), with a precision of 1 Hz. The maximum frequency on the IN A input is 60 kHz. The maximum cyclic ratio at 60 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 5 µs (without anti-bounce filter).
	Period measurement	This mode is used to: ■ Determine the duration of an event ■ Determine the time between 2 events ■ Time and measure the execution time of a process It measures the time elapsed during an event or between 2 events (IN_A input) according to a selectable time base of 1 µs, 100 µs or 1 ms. The IN_SYNC input can be used to enable or stop a measurement. The module can carry out a maximum of 1 measurement every 5 ms. The shortest measurable pulse is 100 µs, even if the unit defined by the user is 1 µs. The maximum measurable duration is 4,294,967,295 units (unit to be defined).
	Ratio counting	Ratio counting mode only uses the IN_A and IN_B inputs. There are 2 possible modes: ■ Ratio 1: Used to divide 2 frequencies. This is intended for applications such as flowmeters, mixers, etc. ■ Ratio 2: Used to subtract 2 frequencies. This is intended for the same applications, but for those requiring more precise regulation (more similar frequencies). Ratio 1 mode gives the results in thousandths for better accuracy (a display of 2000 corresponds to a value of 2) and ratio 2 mode gives the results in Hz. The maximum frequency that the module can measure on the IN_A and IN_B inputs is 60 kHz.
	Downcounting	This mode is used to list a group of operations. In this mode, activating the synchronization function starts the counter which, starting from a user-defined preset value, decreases with each pulse applied to the IN_A input, until it reaches 0. This downcounting is made possible when the enable function has been activated. The counting register is thus updated at 1 ms intervals. One basic use of this mode is to signal, using an output, the end of a group of operations (when the counter reaches 0). The shortest pulse applied to the IN_SYNC input is 100 µs. The maximum frequency applied to the IN_SYNC input is 1 pulse every 5 ms. The maximum user-defined preset value is 4,294,967,295. The maximum count value is 4,294,967,295 units.
	Loop (modulo) counting	This mode is used in packaging and labelling applications where actions are repeated on sets of moving objects: ■ In upcounting, the counter increases until it reaches the user-defined “modulo - 1” value. On the next pulse, the counter is reset to 0 and upcounting restarts. ■ In downcounting, the counter decreases until it reaches 0. On the next pulse, the counter is reset to the user-defined “modulo - 1” value. Downcounting can then restart. The maximum frequency applied to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the modulo event is 1 event every 5 ms. The maximum modulo value is 4,294,967,296 (possible by declaring 0 in the modulo adjust value).
	32-bit counter counting	This mode is mainly used in axis following. The maximum frequency applied simultaneously to the IN_A and IN_B inputs is 60 kHz. The maximum frequency of the referencing event is 1 event every 5 ms. The counter value is between - 2,147,483,648 and + 2,147,483,647.
	Width modulation	In this operating mode, the module uses an internal clock generator to supply a periodic signal on the module's O0 output. Only the O0 output is affected by this mode, as the O1 output is independent of it. The maximum output frequency is 4 kHz. As O0 is a source output, a load resistor is necessary for the O0 output signal to change to 0 at the correct frequency. The cyclic ratio adjustment range varies according to the frequency of the O0 output.

2

Operating modes for module BMX EHC 0800

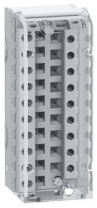
5 configurable 16-bit modes	Frequency meter	This mode measures a frequency, speed, rate or data stream control. As standard, this mode measures the frequency received on the IN A input. This frequency is always expressed in Hz (number of pulses per second), with a precision of 1 Hz. The maximum frequency on the IN A input is 10 kHz. The maximum cyclic ratio at 10 kHz is 60%.
	Event counting	This mode is used to determine the number of events received. In this mode, the counter calculates the number of pulses applied to the IN_A input at time intervals defined by the user. As an option, it is possible to use the IN_AUX input during a period of time, provided that the enable bit has been configured. The module counts the pulses applied to the IN_A input each time the pulse for this input lasts longer than 50 µs (without anti-bounce filter). Pulses with less than 100 ms synchronization are lost.
	Downcounting	This mode is used to list a group of operations. In this mode, when counting is enabled (software validation via the valid_sync command), a rising or falling edge on the IN_AUX input causes a value, defined by the user, to be loaded in the counter. The latter decreases with each pulse applied to the IN_A input until it reaches the value 0. Downcounting is made possible when the force_enable command is high (software positioning). The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency applied to the IN_AUX input is 1 pulse every 25 ms.
	Loop (modulo) counting	This mode is used in packaging and labelling applications where actions are repeated on sets of moving objects. The counter increases with each pulse applied to the IN_A input until it reaches the user-defined “modulo - 1” value. On the next pulse in the upcounting direction, the counter is reset to 0 and upcounting restarts. The maximum frequency applied to the IN_A input is 10 kHz. The smallest pulse applied to the IN_AUX input varies according to the selected filter level. The maximum frequency of the modulo event is 1 event every 25 ms. The maximum modulo value is 65,536 units.
	Up/down counter	This mode is used for an accumulation, upcounting or downcounting operation on a single input. Each pulse applied to the IN_A input produces: ■ Upcounting of pulses if the IN_AUX input is high ■ Downcounting of pulses if the IN_AUX input is low The counter values vary between the limits - 65,536 and + 65,535. The maximum frequency applied to the IN_A input is 10 kHz. Pulses applied to the IN_A input after a change of direction are only upcounted or downcounted after a period corresponding to the delay for taking account of the state of the IN_AUX input due to the programmable filter level on this input.
One 32-bit mode	32-bit counter counting	32-bit counter counting mode is available for channels 0, 2, 4 and 6 (channels 1, 3, 5 and 7 are now inactive). It behaves in the same way as the up/down counting mode using up to 3 physical inputs. It enables simultaneous upcounting and downcounting. The counter values vary between the limits - 2,147,483,648 and + 2,147,483,647 (31 bits + sign). The maximum frequency applied to the IN_A and IN_B inputs is 10 kHz. The smallest pulse applied to the IN_AUX input is defined according to the filtering applied to this input. The maximum frequency of loading the preset value is 1 every 25 ms.

Modicon M340 automation platform

BMX EHC 0200/0800 counter modules

BMX EHC 0200

BMX EHC 0800



BMX FTB 20●0

References

BMX EHC 0200/0800 counter modules *(1)*

Description	No. of channels	Characteristics	Reference	Weight kg
Counter modules for 24 V ⎓ 2 and 3-wire sensors and 10/30 V ⎓ incremental encoders with push-pull outputs	2	60 kHz counting	**BMX EHC 0200**	0.112
	8	10 kHz counting	**BMX EHC 0800**	0.113

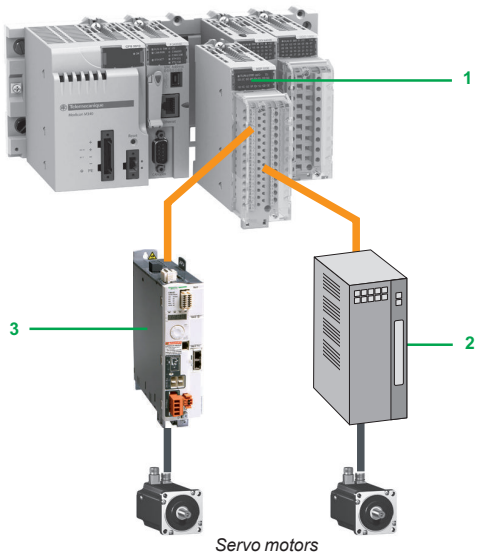
Connection accessories *(2)*

Description	Composition	Unit reference	Weight kg
Pack of connectors for BMX EHC 0200 module	Two 16-way connectors and one 10-way connector	**BMX XTS HSC 20**	0.021
20-way removable terminal blocks for BMX EHC 0800 module	Cage clamp	**BMX FTB 2000**	0.093
	Screw clamp	**BMX FTB 2010**	0.075
	Spring	**BMX FTB 2020**	0.060
Shielding connection kit for BMX EHC 0200/0800 modules	Comprising a metal bar and two support bases for mounting on rack	See page 1/11	–

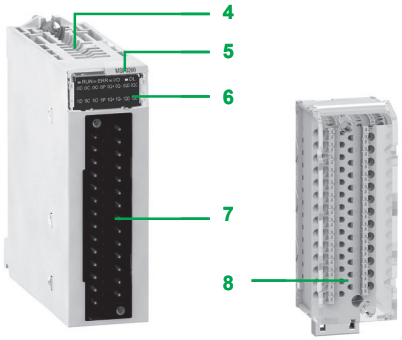
(1) Typical consumption: See the power consumption table on page 7/16.
(2) The shielding on the cordsets carrying the counter signals must always be connected to the ***BMX XSP●●00*** *shielding connection kit mounted under the rack which holds the* ***BMX EHC 0200*** *module (see page 1/11).*

Modicon M340 automation platform

BMX MSP 0200 motion control module



Servo motors



BMX MSP 0200 *BMX FTB 2820*

Presentation

The 1 **BMX MSP 0200** motion control *pulse train output* (PTO) module for the Modicon M340 automation platform is used for controlling third-party variable speed drives 2 which have an integrated position loop and inputs that are compatible with open collector outputs.

The **BMX MSP 0200** control module is also directly compatible with the Lexium 32C and 32M 3 servo drive ranges, which have an integrated pulse control interface.

The **BMX MSP 0200** motion control PTO module has two independent PTO channels. Like any other application-specific module, it is installed in the rack slots (labelled 01 to 11). The number of modules is limited by the maximum number of application-specific channels permitted according to the CPU type:

- Standard **BMX P34 1000**: Maximum of 20 application-specific channels *(1)*
- Performance **BMX P34 20●0**: Maximum of 36 application-specific channels *(1)*

Description

The **BMX MSP 0200** motion control module is standard format (1 slot). Its housing provides IP 20 protection of the electronics and it is locked in each slot (01 to 11) by a captive screw.

The front panel of the **BMX MSP 0200** motion control module features:

4 A rigid body providing support and protection for the electronic card

5 A module reference marking (a label is also visible on the right-hand side of the module)

6 A display block indicating:

- Module status, 4 LEDs (RUN, ERR, I/O and DL)
- Status of the auxiliary inputs, 4 per channel
- Status of the PTO outputs, 2 per channel
- Status of the auxiliary outputs, 2 per channel

7 A connector for a 28-way terminal block, for connecting to a removable spring terminal block on sensors and preactuators

To be ordered separately:

8 A 28-way removable spring terminal block **BMX FTB 2820**, supplied with a channel identification label

- A shielding connection kit to protect against electrostatic discharge, consisting of a metal bar and two sub-bases for mounting on the rack: **BMX XSP ●●00** (reference dependent on the number of slots in the rack) (see page 1/11)
- A set of clamping rings **STB XSP 30●0** for the connection cable shielding braids (reference dependent on the cable Ø) (see page 1/11)

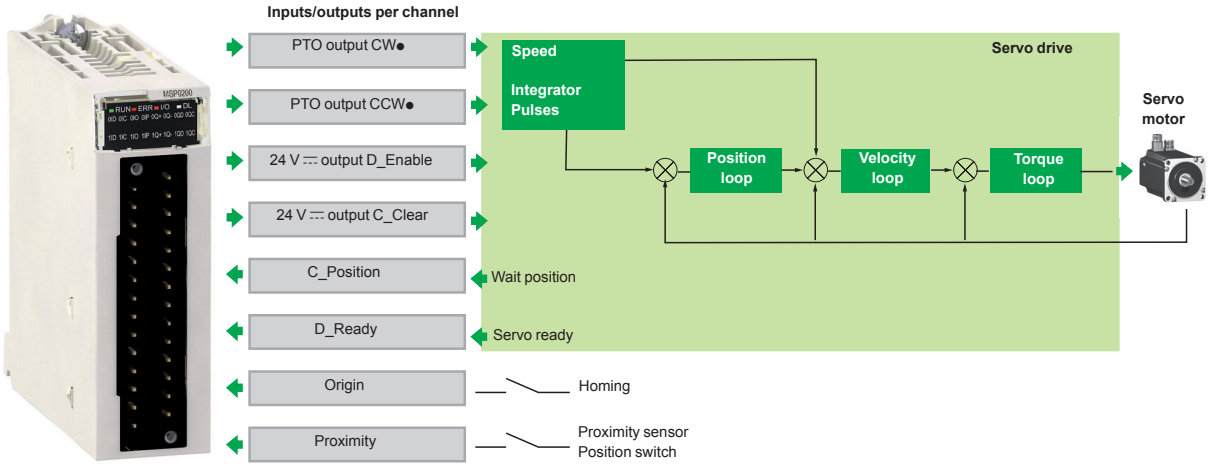
(1) Application-specific channels: BMX EHC 0200 (2-channel) and BMX EHC 0800 (8-channel) counter modules, BMX MSP 0200 (2-channel) motion control module and BMX NOM 0200 (2-channel) and BMX NOR 0200H (1-channel) serial communication modules

Processors: page 1/2 | Communication: page 3/2 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform
BMX MSP 0200 motion control module

Operation

Block diagram of a BMX MSP 0200 module channel



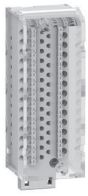
BMX MSP 0200

References

Motion control modules *(1)*

Description	Number of channels	Description per channel	Reference	Weight kg
PTO module *(PTO = Pulse Train Output)*	2	2 x 200 kHz max. PTO outputs 2 x 24 V ⎓/50 mA auxiliary outputs 4 x 24 V ⎓ auxiliary inputs	**BMX MSP 0200**	0.145

BMX MSP 0200



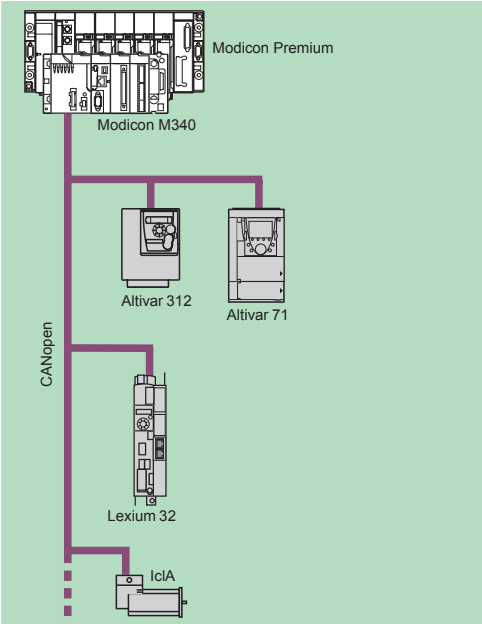
BMX FTB 2820

Cabling accessories

Description	Description, use	Length	Reference	Weight kg
28-way removable terminal block	Spring	–	**BMX FTB 2820**	0.080
Connection cable for daisy chain or pulse control *(2)*	From BMX MSP 0200 (screw terminal block) module to Lexium 32C or 32M (RJ45 connector) *(cable with flying leads at one end and an RJ45 connector at the other)*	3 m *(3)*	**VW3 M8 223 R30**	–
Shielding connection kit for module BMX MSP 0200	Comprising a metal bar and two support bases for mounting on rack	–	See page 1/11	–

(1) Typical consumption: See the power consumption table on page 7/16.
*(2) The shielding on the cordsets carrying the motion control signals must always be connected to the **BMX XSP ●●00** shielding connection kit mounted under the rack holding the **BMX MSP 0200** module (see page 1/11).*

Modicon M340 automation platform
MFB motion control



MFB: Motion control distributed over CANopen

PLCopen motion control

Presentation

MFB *(Motion Function Blocks)* is a library of function blocks integrated in Unity Pro used to set up motion control in the architectures of drives and servo drives on CANopen buses:

- Altivar 312: For asynchronous motors from 0.18 to 15 kW
- Altivar 71: For synchronous or asynchronous motors from 0.37 to 500 kW
- Lexium 32: For servo motors from 0.15 to 7 kW
- IclA IFA/IFE/IFS: For integrated motor drives from 0.05 to 0.25 kW

In compliance with PLCopen specifications, the MFB library allows both easy and flexible motion programming with Unity Pro, as well as axis diagnosis. In maintenance operations, drives can be replaced quickly and safely thanks to drive parameter download blocks.
Setting up drives on the CANopen network is facilitated through *Motion Tree Manager* organization in the Unity Pro browser, making it easy for users to access the application drives.

Applications

The features of the *Motion Function Blocks* library are particularly suitable for machines with independent axes. In the case of these modular/special machines, MFB function blocks are the perfect solution for controlling single axes. The following are typical applications for this type of architecture:

- Automatic storage/removal
- Material handling
- Palletizers/depalletizers
- Conveyors
- Packaging, simple label application
- Grouping/ungrouping
- Adjustment axes in flexible machines, etc.

Functions

The table below lists the function blocks of the MFB library and the drives compatible with them. The prefix indicates the block family:

- MC: Function block defined by the Motion Function Blocks PLC Open standard
- TE: Function block specific to Schneider Electric products
- Lxm: Function block specific to Lexium servo drives

Type	Function	Function block	Altivar 312	Altivar 71	Lexium 32	IclA IFA/ IFE/IFS
Management and motion	Read an internal parameter	MC_ReadParameter				
	Write an internal parameter	MC_WriteParameter				
	Read the current position	MC_ReadActualPosition				
	Read the instantaneous speed	MC_ReadActualVelocity				
	Acknowledge error messages	MC_Reset				
	Stop all active movement	MC_Stop				
	Axis coming to standstill	MC_Power				
	Movement to absolute position	MC_MoveAbsolute				
	Relative movement	MC_MoveRelative				
	Additional movement	MC_MoveAdditive				
	Homing	MC_Home				
	Movement at given speed	MC_MoveVelocity				
	Read diagnostic data	MC_ReadAxisError				
	Read servo drive status	MC_ReadStatus				
	Torque control	MC_TorqueControl				
	Read actual torque value	MC_ReadActualTorque				
	Manual control	MC_Jog				
Save and restore parameters (FDR)	Read all parameters and store in PLC memory	TE_UploadDriveParam				
	Write all parameters from the PLC memory	TE_DownloadDriveParam				
Advanced Lexium functions	Read a motion task	Lxm_UploadMTask				
	Write a motion task	Lxm_DownloadMTask				
	Start a motion task	Lxm_StartMTask			*(1)*	
	Set the reduction ratio, signed	Lxm_GearPosS			*(1)*	
System	Communication with the servo drive	TE_CAN_Handler				

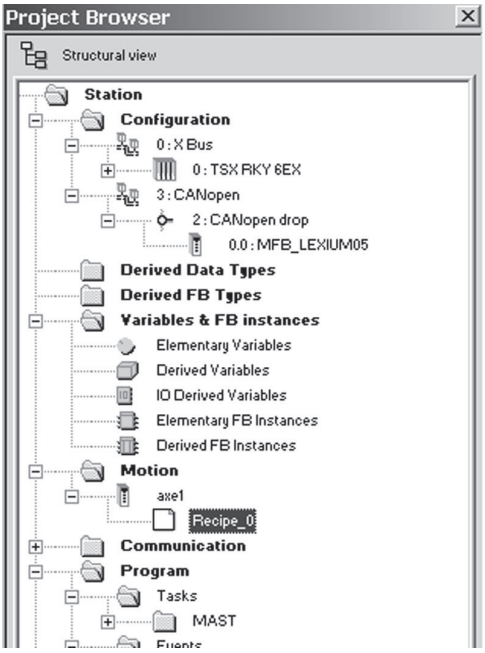
Compatible

(1) The Lxm_StartMTask and Lxm_GearPosS function blocks are only compatible with the M type Lexium 32 (LXM 32M) servo drives.

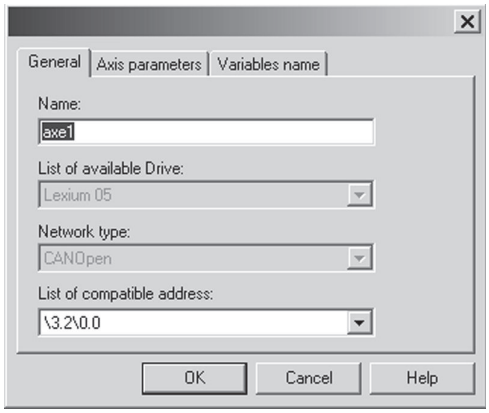
Processors: page 1/2 | Communication: page 3/2 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Schneider Electric

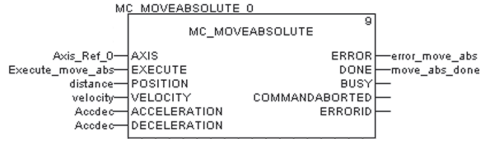
Modicon M340 automation platform
MFB motion control



Motion Tree Manager integrated in the Unity Pro browser



General parameters: Axis name and address



MFB: Programming a movement in absolute mode

Motion Tree Manager

Motion Tree Manager is associated with Unity Pro's MFB library and integrated in its browser. It provides specific assistance for:
- Axis object management
- Axis variable definition
- Drive parameter management

Motion Tree Manager automatically creates links between the CANopen bus configuration and the MFB function block data using a limited amount of configuration data.

General axis parameters

In this tab, the designer is prompted to define:
- The name of the axis that will identify it in the browser for the entire application
- The address of the drive on the CANopen bus

Axis parameters

The drop-down lists in this tab are used to determine the exact type of drive: Family, version.

Variable names

This last tab is used to identify data structures:
- **Axis_Reference:** Used by all the instances of function blocks for the axis in question
- **CAN_Handler:** Used to manage communication with the drive via the CANopen network

Recipe definition

The "recipes" attached to the axis are the data structures containing all the adjustment parameters of a given drive. This data is used when:
- Changing the drive with restoration of the context during *"Faulty Device Replacement"* (FDR) maintenance
- Changing the manufacturing program of the machine and calling up an appropriate set of parameters: servo control gains, limitations, etc. adapted to the weight and size of the moving parts
- Saving parameters in the initial values of the PLC application

Programming, diagnostics and maintenance

Communication between the PLC and drive is automatically set up by the system as soon as a TE_CAN_Handler instance is declared in the Unity Pro task with which the axis is associated. Movements are then programmed by sequencing function blocks from the library in the user's chosen Unity Pro editor (LD, ST, FBD).

The two function blocks, MC_ReadStatus, and in some cases MC_ReadAxisError, are useful for determining the overall status of the axis, as well as the code of active warnings or errors.

The function blocks TE_UploadDriveParam and TE_DownloadDriveParam allow the application to save all the parameters of a drive (recipe) and to then quickly reload them into another drive if the first one fails.

Modicon M340 automation platform

Quick wiring adapters for Modicon M340 PLC

2

Presentation

The Quick Wiring Adapters is a set of connectors for the M340 Range. These connectors are intended to simplify the replacement of a legacy Modicon Compact PLC with our latest offer, the M340 PLC.
The adapters allow IO field wiring connectors to be removed from the Compact PLC and plugged directly into the M340.
Thirteen new references make the necessary wiring translations between Compact and M340 IO modules and fully meet the mechanical environmental specifications of the M340 range.

Quick Wiring Adapters Features

The Quick Wiring Adapters have the same look and feel as the standard M340 IO module connectors. The new connectors increase the depth and extend below the IO module.

- The quick wiring adapters use the same mounting/retention screws to hold the adapter to the M340 module
- The adapter receptacles accept the two (2) Compact IO module field wiring connectors
- A clear cover is sized to retain the wiring harness
- The cover also has features to accept and retain the wiring label that was used on the Compact IO module

Compact modules/M340 modules compatibility

Type of module	Compact Module reference	Compact Module Comment	M340 Module reference	M340 Module Comment	M340 Compatibility	Quick Wiring Adapter reference
Digital input	AS-BDE O 216	24 VDC 16 Point Input Module	BMX DDI 1602	16 point 24 VDC input sink	O.K.	990 XSM00206
	AS-BDEP 208	230 VAC 8 Point Input Module	–	–	No exact replacement but Modicon Telefast separate product line can handle it.	–
	AS-BDEP 209	120 VAC 8 Point Input Module	BMX DAI 1604	16 point 110 VAC input	O.K.	990 XSM00213
	AS-BDEP 210	115 VAC 8 Point Input Module	BMX DAI 1604	16 point 110 VAC input	O.K.	990 XSM00213
	AS-BDEP 211	115 VAC 8 Point Input Module	BMX DAI 1604	16 point 110 VAC input	O.K.	None
	AS-BDEP 214	12-60 VDC 16 Point Input Module	BMX DDI 1603	16 point 48 VDC input	No replacement for 12 V, 24 V and 60 V	990 XSM00206
	AS-BDEP 215	5 VDC TTL 16 Point Input Module	–	–	No exact replacement but can be replaced with HMI functionality.	None
	AS-BDEP 216	24 VDC 16 Point Input Module	BMX DDI 1602	16 point 24 VDC input sink	O.K.	990 XSM00206
	AS-BDEP 217	24 VDC 16 Point Input Module	BMX DAI 1602	16 point 24 VDC input sink	OK but need negative logic.	990 XSM00201
	AS-BDEP 218	115 VAC 16 Point Input Module	BMX DAI 1604	16 point 110 VAC input	O.K.	990 XSM00201
	AS-BDEP 220	Fast 24 VDC 16 Point Input Module			Depending upon the response time there are replacements.	None
	AS-BDEP 254	12-60 VDC 16 Point Input Module	BMX DDI 1603H	16 point 48 VDC input	BMXDDI1603 input threshold is 34 V versus 12 V for AS-BDEP254. Temperature is 0 to + 60 °C for BMXDDI1603 where AS-BDEP254 is rated for - 40 to + 70 °C	990 XSM00206
	AS-BDEP 254C	12-60 VDC 16 Point Input Module, ext temp + Coated	BMX DDI 1603H	16 point 48 VDC input	BMXDDI1603 input threshold is 34 V versus 12 V for AS-BDEP254. Temperature is 0 to + 60 °C for BMXDDI1603 where AS-BDEP254 is rated for - 40 to + 70 °C	990 XSM00206
	AS-BDEP 256	24 VDC 16 Point Input Module	BMX DDI 1602H	16 point 24 VDC input sink	BMXDDI1602 is only rated for 0 to + 60 °C versus - 40 to + 70 °C for AS-BDEP256.	990 XSM00206
	AS-BDEP 256C	24 VDC 16 Point Input Module, ext temp + Coated	BMX DDI 1602H	16 point 24 VDC input sink	BMXDDI1602 is only rated for 0 to + 60 °C versus - 40 to + 70 °C for AS-BDEP256C	990 XSM00206
	AS-BDEP 257	110 VDC 16 inputs Ext. Temp	BMX DDI 1604T	16 point 125 VDC input	Nominal input voltage for BMXDDI1604 is 100 to 150 VDC versus 55 to 170 VDC for AS-BDEP257. Response time for BMXDDI1604 is 9 ms versus 6 ms for the AS-BDEP257. Temperature for BMXDAI1604T is -25 to + 70 °C versus - 40 to + 70 °C.	990 XSM00206
	AS-BDEP 257C	110 VDC 16 inputs, ext temp + Coated	BMX DDI 1604T	16 point 125 VDC input	Nominal input voltage for BMXDDI1604 is 100 to 150 VDC versus 55 to 170 VDC for AS-BDEP257. Response time for BMXDDI1604 is 9 ms versus 6 ms for the AS-BDEP257. Temperature for BMXDDI1604T is -25 to + 70 °C versus - 40 to + 70 °C. No conformal coat available.	990 XSM00206
	AS-BDEP 296	60 VDC 16 inputs	–	–	No replacement	–
	AS-BDEP 297	48 VDC 16 inputs	BMX DDI 1603	16 point 48 VDC input	O.K.	990 XSM00206

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Red color indicates that there are no direct replacements but there are workarounds. Please consult Schneider Electric for assistance.

Compact modules/M340 modules compatibility

Type of module	Compact Module reference	Comment	M340 Module reference	Comment	M340 Compatibility	Quick Wiring Adapter reference
Digital output	AS-BDAO 216	24 VDC 16 Point Output Module	BMX DDO 1602	16 point Output 24 VDC	O.K with slightly slower response. BMXDDO1602 response time 1.2 ms vs. < 1 ms for AS-BDAO216	990 XSM00206
	AS-BDAP 204	4 Point Relay (NO) Module	BMX DRA 0805	8 point relay outputs	O.K. 4 relay on Compact 8 on M340.	990 XSM00203
	AS-BDAP 208	8 Point Relay (NO) Module	BMX DRA 0805	8 point relay outputs	O.K.	990 XSM00206
	AS-BDAP 258	8 Point Relay (NO) Module	BMX DRA 0805H	8 point relay outputs	O.K. But Extended temperature differences	990 XSM00206
	AS-BDAP 258C	24 VDC 8 Point Relay (NO) Module, ext temp + Coated	BMX DRA 0805H	8 point relay outputs	O.K. Temperature limitation where 0 to + 60 °C versus - 40 to + 70 °C and the BMXDRA0805H.	990 XSM00206
	AS-BDAP 209	120 VAC 8 Point 1A Output Module	BMX DAO 1605	16 point output 110 VAC to 230 VAC	Less amperage available. BMXDAO1605 is limited to 600 mA vs. 1A for AS-BDAP 210 AS-BDAP210 nominal voltage goes down to 85 V vs. 100 V for BMXDAO1605	990 XSM00204
	AS-BDAP 210	24-230 VAC 8 Point Output Module	BMX DAO 1605	16 point output 110 VAC to 230 VAC	Less amperage available. BMXDAO1605 is limited to 600 mA vs. 1A for AS-BDAP210. AS-BDAP 210 nominal voltage goes down to 85 V vs. 100 V for BMXDAO1605	990 XSM00204
	AS-BDAP 212	24 VDC 8 Point Input/4 Point Output 2A	BMX DDM 16025	8 point 24 VDC input + 8 point relay output	Compact 2 groups of 2 outputs, M340 1 group of 8. So difference inputs isolation issue	990 XSM00205
	AS-BDAP 252	24 VDC 8 Point Input/4 Point Output 2A	BMX DDM 16025H	8 point 24 VDC input + 8 point relay output	Compact 2 groups of 2 outputs, M340 1 group of 8. So difference inputs isolation issue Extended temperature differences	990 XSM00205
	AS-BDAP 216	24 VDC 16 Point Output Module	BMX BMX DDO 1602	16 point 24 VDC output	Compact is 2 groups of 8, M340 1 group of 16. So difference inputs isolation	990 XSM00206
	AS-BDAP 256	24 VDC 16 Point Output Module	BMX BMX DDO 1602H	16 point 24 VDC output	Compact is 2 groups of 8, M340 1 group of 16. So difference inputs isolation Extended temperature differences	990 XSM00206
	AS-BDAP 217	5-24 VDC 16 Point Output Module	BMX BMX DDO 1612	16 point 24 VDC output sink	Response time is slightly slower. BMXDDO1612 at 1.2 ms versus <1 ms for AS-BDAP217. Also Compact is 2 groups of 8, M340 1 group of 16.	990 XSM00206
	AS-BDAP 218	24-240 VAC 16 Point Output Module	BMX DAO 1605	16 point output 110 VAC to 230 VAC	Less amperage available. BMXDAO1605 is limited to 600 mA vs. 1 A for AS-BDAP210 AS-BDAP 210 nominal voltage goes down to 24 V vs. 100 V for BMXDAO1605. If 24 V is needed select a different module.	990 XSM00202
	AS-BDAP 211	120 VAC Mixed Press and Stamp Module, Inputs controlling Outputs	–	–	None	None
Digital input/output	AS-BDAP 220	24 VDC 8 Point Input/ Output Module 2A	BMX DDM16022	8 point 24 VDC input + 8 point 24 VDC output	BMXDDM16022 is limited to 0.625 A per channel versus AS-BDAP220 2 A. Also response time is 1.2 ms versus < 1 ms for AS-BDAP220	990 XSM00207
	AS-BDAP 250	24 VDC 8 Point Input/ Output Module	BMX DDM16022H	8 point 24 VDC input + 8 point 24 VDC output	BMXDDM16022 is limited to 0.625 A per channel versus AS-BDAP250 2 A and is not conformally coated. Also response time is 1.2 ms versus < 1 ms for AS-BDAP220. BMXDDM16022 is 0 to + 60 °C versus - 40 to + 70 °C for AS-BDAP250C.	990 XSM00207
	AS-BDAP 250C	24 VDC 8 Point Input/ Output Module, ext temp + Coated	BMX DDM16022H	8 point 24 VDC input + 8 point 24 VDC output	BMXDDM16022 is limited to per channel versus AS-BDAP250 2 A. Also response time is 1.2 ms versus <1 ms for AS-BDAP220. DDM16022 is 0 to + 60 °C versus - 40 to + 70 °C for AS-BDAP250C.	990 XSM00207
	AS-BDAP 212	24 VDC 8 inputs 4 outputs	BMX DDM 16025	8 point 24 VDC input + 8 point relay output	Compact 2 groups of 2 outputs, M340 1 group of 8. So difference inputs isolation.	990 XSM00205
	AS-BDAP 252	24 VDC 8 inputs 4 outputs	BMX DDM 16025H	8 point 24 VDC input + 8 point relay output	BMXDDM16025 is 0 to + 60 °C versus - 40 to + 70 °C. Compact 2 groups of 2 outputs, M340 1 group of 8. So difference inputs isolation.	990 XSM00205
	AS-BDAP 252C	24 VDC 8 inputs 4 outputs, ext temp + Coated	BMX DDM 16025H	8 point 24 VDC input + 8 point relay output	BMXDDM16025 is 0 to + 60 °C versus - 40 to + 70 °C. Compact 2 groups of 2 outputs, M340 1 group of 8. So difference inputs isolation.	990 XSM00205
	AS-BDAP 253	110 VDC 8 inputs 4 outputs	BMX DDM 16025H	8 point 24 VDC input + 8 point relay output	1) Compact inputs 110 VDC, M340 24 VDC 2) Compact 2 groups of 2 outputs, M340 1 group of 8. a) isolation issue b) 4 unused references,	None
	AS-BDAP 253C	110 VDC 8 inputs 4 outputs, ext temp + Coated	BMX DDM 16025H	8 point 24 VDC input + 8 point relay output	1) Compact inputs 110 VDC, M340 24 VDC 2) Compact 2 groups of 2 outputs, M340 1 group of 8. a) isolation issue b) 4 unused references	None
	AS-BDAP 292	60 VDC 8 Inputs 4 outputs	–	–	No exact replacement but contact Schneider Electric Technical support for workarounds.	None

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Modicon M340 automation platform

Quick wiring adapters for Modicon M340 PLC

Compact modules/M340 modules compatibility

Type of module	Compact Module reference	Comment	M340 Module reference	Comment	M340 Compatibility	Quick Wiring Adapter reference
Analog input	AS-BADU 204	4 Channel, ± 0,5 V, Register, PT100, 11 Bit	BMX ART 0414	Analog 4 channel TC/RTD Isolated inputs	O.K., but ± 0.5V missing, also M340 has Channel to Channel and Channel to Bus Isolation	None
	AS-BADU 205	4 Channel Register Input	BMX AMI 0410	Analog 4 channel Current/ Voltage Input Isolated	O.K. Scaling differences	990 XSM00208
	AS-BADU 205	4 Channel Register Input	BMX AMM0600	Analog 4 channel Current/ voltage input non-isolated and 2 channel Current/ voltage output non-isolated	O.K. Scaling differences	990 XSM00209
	AS-BADU 206	4 Channel Register Input isolated	BMX AMI 0410	Analog 4 channel Current/ Voltage Input Isolated	O.K, however M340 does not have ± 1V range.	990 XSM00210
	AS-BADU 206	4 Channel Register Input isolated	BMX AMM0600	Analog 4 channel Current/ voltage input non-isolated and 2 channel Current/ voltage output non-isolated	O.K, however M340 does not have ± 1V range. No isolation	990 XSM00211
	AS-BADU 210	4 Channel Voltage/Current Input isolated	BMX AMI 0410	Analog 4 channel Current/ Voltage Input Isolated	O.K. Scaling differences M340 does not have all voltage ranges matched	990 XSM00210
	AS-BADU 210	4 Channel Voltage/Current Input isolated	BMX AMM0600	Analog 4 channel Current/ voltage input non-isolated and 2 channel Current/ voltage output non-isolated	O.K. Scaling differences M340 does not have all voltage ranges matched No isolation	990 XSM00211
	AS-BADU 211	8 Channel Analog Input Module Thermo	BMX ART 0814	Analog 8 channel TC/RTD Isolated inputs	O.K. M340 missing 2, 5, or 10 V input capability or 4-20 mA , ± 20 mA and missing external 24 V	None
	AS-BADU 212	8 Channel Analog Input Module Thermo	BMX ART 0814	Analog 8 channel TC/RTD Isolated inputs	O.K. M340 missing 2, 5, or 10 V input capability or 4-20 mA , ± 20 mA and missing external 24 V	None
	AS-BADU 214	4/8 Channel Multi Range Analog/Digital Input	BMX ART 0414	Analog 4 channel TC/RTD Isolated inputs	M340 missing Voltage range 0 - 10 V, 1 to 5, 2 to 10. and no loop capability.	None
	AS-BADU 216	4/8 Channel Thermocouple isolated	BMX ART 0814	Analog 8 channel TC/RTD Isolated inputs	OK	None
	AS-BADU 254	4 Channel Register Input	BMX AMI 0410H	Analog 4 channel Current/ Voltage Input Isolated	Ok, and M340 has CH/CH isolation and CH/Bus where Compact has none. Extended temperature differences	None
	AS-BADU 254	4 Channel Register Input	BMX AMM0600H	Analog 4 channel Current/ Voltage input and 2 channel Current Voltage Output	Ok. M340 has 4 inputs and 2 outputs. Extended temperature differences	None
	AS-BADU 254C	4 Channel Register Input, ext temp + Coated	BMX AMI 0410H	Analog 4 channel Current/ Voltage Input Isolated	Ok, and M340 has CH/CH isolation and CH/Bus where Compact has none. Extended temperature differences	None
	AS-BADU 254C	4 Channel Register Input, ext temp + Coated	BMX AMM0600H	Analog 4 channel Current/ Voltage input and 2 channel Current Voltage Output	OK, M340 has 4 inputs and 2 outputs. With no isolation Extended temperature differences	None
	AS-BADU 256	4 Channel Register Input Isolated	BMX AMI 0410H	Analog 4 channel Current/ Voltage Input Isolated	OK but Extended temperature differences	None
	AS-BADU 256	4 Channel Register Input Isolated	BMX AMM0600H	Analog 4 channel Current/ Voltage input and 2 channel Current Voltage Output	OK, M340 has 4 inputs and 2 outputs. With no isolation Extended temperature differences	None
	AS-BADU 256C	4 Channel Register Input Isolated, ext temp + Coated	BMX AMI 0410H	Analog 4 channel Current/ Voltage Input Isolated	OK but Extended temperature differences	990 XSM00210
	AS-BADU 256C	4 Channel Register Input Isolated, ext temp + Coated	BMX AMM0600H	Analog 4 channel Current/ Voltage input and 2 channel Current Voltage Output	OK M340 has 4 inputs and 2 outputs with no isolation	990 XSM00211
	AS-BADU 257	8 Channel Thermocouple	BMX ART 0814H	Analog 8 channel TC/RTD Isolated inputs	Ok but extended temperature differences	None
	AS-BADU 257C	8 Channel Thermocouple, ext temp + Coated	BMX ART 0814H	Analog 8 channel TC/RTD Isolated inputs	Ok but extended temperature differences	None
Analog output	AS-BDAU 202	2 Point AN Outputs, ± 10 V, ± 20 mA	BMX AMO 0210	Analog 2 channel Current/ Voltage Output Isolated	M340 has no negative 20 mA capability.	990 XSM00212
	AS-BDAU 204	4 Channel Analog Output,Opto-Isol.	BMX AMO 0210	Analog 2 channel Current/ Voltage Output Isolated	M340 does not support 0 to 1 V, 0 to 5 V, ± 1V, +-5 V ranges	None
	AS-BDAU 208	8 Channel Register Output			No 8 point analog output Need to use two modules.	None
	AS-BDAU 252	2 Point AN Outputs, ± 10 V, ± 20 mA Extended Temperature	BMX AMO 0210H	Analog 2 channel Current/ Voltage Output Isolated	M340 has no negative 20 mA capability. Extended temperature differences	990 XSM00212
	AS-BDAU 252C	2 Point AN Outputs, ± 10 V, ± 20 mA , ext temp + Coated	BMX AMO 0210H	Analog 2 channel Current/ Voltage Output Isolated	M340 has no negative 20 mA capability. Extended temperature differences	990 XSM00212
Comm.	AS-BBKF 202	INTERBUS S Slave	–	–	No replacement	None
	AS-BBKF201-16	16 Word INTERBUS S Master	–	–	No replacement	None
	AS-BBKF201-64	64 Word INTERBUS S Master	–	–	No replacement	None
	CM900	Auto Interface	–	–	No replacement	None

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Compact modules/M340 modules compatibility

Type of module	Compact Module reference	Comment	M340 Module reference	Comment	M340 Compatibility	Quick Wiring Adapter reference
Ser. Comm.	AS-BKOS260-24	24 Word Universal Comm	–	–	Contact Schneider Electric Technical support for clarification of the best fit. READ_VAR functionality might replace this.	None
	AS-BKOS260-64	64 Word Universal Comm	–	–	Contact Schneider Electric Technical support for clarification of the best fit. READ_VAR functionality might replace this.	None
	M7251	Programmable limit switch	–	–	No replacement, No Motion	None
	M7350	Resolver Decoder	–	–	No replacement, No Motion	None
Motion	AS-BMOT 201	Axis Motion Control Module Encoder	–	–	Contact Schneider Electric Technical support for clarification of the best fit.	None
	AS-BMOT 202	Axis Motion Control Module Resolver & Encoder	–	–	Contact Schneider Electric Technical support for clarification of the best fit.	None
Counter	AS-BFRQ 204	4 point Frequency Module	BMX EHC 0200	High Speed Counter 2 channel	No 5 V input. Also contact Schneider Electric Technical support for exact replacement	None
	AS-BFRQ 254C	4 point Frequency Module, ext temp + Coated	BMX EHC 0200H	High Speed Counter 2 channel	No 5 V input. Also contact Schneider Electric Technical support for exact replacement	None
	AS-BVIC200 VRC200	4 High Speed Pulse or 4 VRC Inputs	–	–	Contact Schneider Electric Technical support for clarification of the best fit.	None
	AS-BVIC205 CTR205	4 High Speed Pulse or 4 5V TTL Inputs	–	–	Contact Schneider Electric Technical support for clarification of the best fit.	None
	AS-BVIC212 CTR212	4 High Speed Pulse or 12 VDC Inputs	–	–	Contact Schneider Electric Technical support for clarification of the best fit.	None
	AS-BVIC224 CTR224	4 High Speed Pulse or 24 VDC Inputs	BMX EHC 0800	High Speed Counter 8 channel	Contact Schneider Electric Technical support for clarification of the best fit.	None
	AS-BZAE 201	High speed Counter/ Positioner (2 Relay)	BMX EHC 0200	High Speed Counter 2 channel	Counter 12 V O.K., no relay outputs, no 5V, no positioning	None
	AS-BZAE 204	4 Channel High speed Counter/Positioner	BMX EHC 0800	High Speed Counter 8 channel	O.K. No outputs	None
CPU	AS-B984-A145 up to E984-285		BMX P34 2020 + BMX CSP3020	–	Only 1 Modbus port on CPU. 2 port NOM serial module available.	None
	AS-P120 000	105...240 VAC inputs, 24 VDC 1.0A outputs	BMX CSP2000 / BMX CSP3500	–	–	None

Nota:
- Extended temperature modules for M340 have an H suffix at the end of the part number.
- The Modicon Compact PLC line had an extended temperature range of - 40 °C to + 70 °C. The M340 line has an extended temperature of - 25 °C to + 70 °C. Derating of temperature might apply inputs certain applications.
- As with any PLC migration even an exact module to module replacement might not yield the same results (due to scan time, etc).

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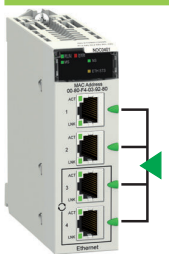
Modicon M340 automation platform

Communication, integrated ports and modules

Applications		Ethernet communication		
Type of device		Processors with integrated Modbus/TCP port	Ethernet modules	
Network protocols		◀ Ethernet Modbus/TCP		
Structure	Physical interface	10BASE-T/100BASE-TX		
	Type of connector	RJ45		
	Access method	CSMA-CD		
	Data rate	10/100 Mbps		
Medium		Double twisted pair copper cable, category CAT 5E Optical fibre via ConneXium cabling system		
Configuration	Maximum number of devices	–		
	Max. length	100 m (copper cable), 4000 m (multi-mode optical fibre), 32,500 m (single-mode optical fibre)		
	Number of modules of the same type per station	1	2 Ethernet or RTU modules per station with any BMX P34 processor	
Standard services		Modbus/TCP messaging		
Transparent Ready conformity class		B10	B30	C30
Embedded Web server services	Standard services	Rack Viewer PLC diagnostics, Data Editor access to PLC data and variables		
	Configurable services	–		Alarm Viewer and Graphic Data Editor
				Hosting and display of user Web pages (14 MB)
Transparent Ready communication services	I/O Scanning service	–	Yes	
	Global Data service	–	Yes	
	NTP time synchronization	–	Yes (module version ≥ 2.0)	
	FDR service	Yes (client)	Yes (client/server)	
	SMTP e-mail notification service	Yes, via EF function block Unity Pro ≥ 4.0	–	
	SOAP/XML Web service	–	–	Server
	SNMP network management service	Yes	Yes	
	RSTP redundancy service	–	–	–
	QoS (Quality of Service) service	–	–	–
RTU communication services IEC 60870-5-104, DNP3 IP or IEC 60870-5-101, DNP3 serial	Master or Slave configuration	–		
	Time and date stamped data exchange	–		
	RTU time synchronization	–		
	Management and buffering of time and date stamped events	–		
	Automatic transfer of time and date stamped events to the Master/SCADA	–		
Data Logging service		–	–	–
Compatibility with processor		–	Standard and Performance (see page 1/2)	
Processor or module references depending on other type of integrated port	No other integrated port		BMX NOE 0100	BMX NOE 0110
	Serial link	BMX P34 2020		
	Ethernet Modbus/TCP			
	CANopen	BMX P34 20302		
Page		3/18	3/19	

Ethernet communication	RTU communication	
Ethernet modules	**RTU module**	
		
◀ EtherNet/IP and Modbus/TCP	**◀ Modbus/TCP, IEC 60870-5-104, DNP3 (subset level 3)**	**◀ Serial link, External modem link, IEC 60870-5-101, DNP3 (subset level 3)**
10BASE-T/100BASE-TX	10BASE-T/100BASE-TX (Modbus/TCP), PPPoE (Point-to-Point Protocol over Ethernet) for ADSL external modem link	Non-isolated RS 232/485 (Serial link), Non-isolated RS 232 (Radio, PSTN, GSM, GPRS/3G external modem link)
Four RJ45 connectors (2 connectors for a ring topology)	One RJ45 connector	One RJ45 connector
CSMA-CD	CSMA-CD (Modbus/TCP), Master/slave (IEC 104/DNP3)	Master/slave (IEC 101/DNP3)
10/100 Mbps	10/100 Mbps (Modbus/TCP)	0.3…38.4 Kbps (Serial link)
Double twisted pair copper cable, category CAT 5E, optical fibre via ConneXium cabling system		Double shielded twisted pair copper cable, Crossover serial cable (Serial link), Direct serial cable (External modem link)
128 (EtherNet/IP or Modbus/TCP)	128 (Modbus/TCP), 32 slaves/servers (IEC 104/DNP3)	32 max.
100 m (copper cable), 4000 m (multi-mode optical fibre), 32,500 m (single-mode optical fibre)		15 m (Non-isolated serial link), 1000 m (Serial link with insulating case)
2 Ethernet or RTU modules per station with any BMX P34 processor		Depending on application-specific channels (20/36 application-specific channels with BMX P34 1000/P34 2●●●●)
EtherNet/IP and Modbus/TCP messaging	Modbus/TCP messaging	Reading/writing digital and analog I/O, counters
B30	C30	–
Rack Viewer PLC diagnostics, Data Editor access to PLC data and variables		–
–	–	–
–	Hosting and display of user Web pages	–
Yes	–	
–	–	
–	Yes	
Yes (client/server)	Yes (client)	–
–	Yes	–
–	Server	–
Yes	Yes (agent)	–
Yes	–	
Yes	–	
–	Yes, IEC101/104 and DNP3	
–	Interrogation via polling and exchanges on change of status (RBE), unsolicited messaging	
–	Yes, IEC101/104 and DNP3	
–	Yes, IEC101/104 and DNP3	
–	Yes, IEC101/104 and DNP3 Buffer holding 10,000 events (per connected client, 4 clients max.)	
–	Yes, on SD 128 MB memory card, in CSV files, access via FTP or sent by e-mail	
Standard and Performance (see page 1/2)		
BMX NOC 0401		
	BMX NOR 0200H	
		BMX NOR 0200H
3/21	3/25	

Modicon M340 automation platform

Communication, integrated ports and modules

3

Applications		CANopen communication		AS-Interface communication
Type of device		Processors with integrated CANopen port		AS-Interface actuator/sensor bus module
Network protocols		◀ CANopen		◀ AS-Interface
Structure	Physical interface	ISO 11898 (9-way SUB-D connector)		AS-Interface V3 standard
	Type of connector	9-way SUB-D		3-way SUB-D
	Access method	CSMA/CA (multiple access)		Master/slave
	Data rate	20 Kbps...1 Mbps depending on distance		167 Kbps
Medium		Double shielded twisted pair copper cable		Two-wire AS-Interface cable
Configuration	Maximum number of devices	63 depending on the devices connected		62 slaves
	Max. length	20 m (1 Mbps)…2500 m (20 Kbps)		100 m, 500 m max. with 2 repeaters
	Number of links of the same type per station	1		BMX P34 1000 processor: 2 AS-Interface modules
				BMX P34 20●0 processor: 4 AS-Interface modules
Standard services		PDO implicit exchange (application data) SDO explicit exchange (service data)		Transparent exchanges with the sensors/actuators
Conformity class		Class M20		M4 profile
SMTP service notification by e-mail		–	Yes, via EF function block Unity Pro ≥ 4.0	–
Compatibility with processor		–		Standard and Performance (see page 1/2)
Type of processor or module depending on other integrated port	None			**BMX EIA 0100**
	Serial link	**BMX P34 20102**		
	Ethernet Modbus/TCP		**BMX P34 20302**	
	CANopen			
Page		3/66		3/71

Serial link communication	
Processors with integrated serial link	**2-channel serial link module**
◀ Modbus and Character mode	
Non-isolated RS 232, 4-wire Non-isolated RS 485, 2-wire	Non-isolated RS 232, 8-wire Isolated RS 485, 2-wire
RJ45	2 RJ45 and 1 RJ45
Master/slave with Modbus link, Full duplex (RS 232)/Half duplex (RS 485) in Character mode	
0.3...38.4 Kbps	0.3...115.2 Kbps in RS 232 0.3...57.6 Kbps in RS 485
Double shielded twisted pair copper cable	Shielded twisted pair copper cable
32 per segment, 247 max.	
15 m (non-isolated), 1000 m with insulating case	15 m with non-isolated RS 232, 1000 m with non-isolated RS 485
1	20/36 application-specific channels with BMX P34 1000/P34 2●●●● (1 application-specific channel = 1 counter, motion control module or serial link channel)
Read/write bits and words, diagnostics in Modbus mode Send and receive character string in Character mode	
–	
–	
–	Standard and Performance (see page 1/2)
BMX P34 1000/2000	
	BMX NOM 0200
BMX P34 2020	
BMX P34 20102	

Modicon M340 automation platform

Communication, integrated ports and modules

Applications		**Modbus Plus communication**	
Type of device		**M340 Modbus Plus proxy module (external)**	
Network protocols		**Ethernet Modbus/TCP**	**Modbus Plus**
Structure	Physical interface	10/100BASE-T	Modbus Plus standard
	Type of connector	Two RJ45 connectors	Two 9-way female SUB-D connectors
	Access method	CSMA-CD	Token ring
	Data rate	10/100 Mbps	1 Mbps
Medium		Double shielded twisted pair copper cable, category CAT 5E (direct or crossover)	Twisted pair copper cable
Configuration	Maximum number of devices	128	32 per segment 64 for all segments
	Max. length	100 m	450 m per segment 1800 m with 3 repeaters
	Number of links of the same type per station	1 max.	
Standard services		Modbus/TCP messaging	Modbus Plus messaging
Conformity class		–	–
Embedded Web server service	Standard service	Configuration, diagnostics	
	Configurable services	–	
Communication services		Modbus Plus server (scanned by the PLC)	Reading/writing variables
		FDR service	Global database
		SNMP agent network management service	Peer Cop service
24 V ⎓ external power supply		19.2…31.2 V	
Module types		**TCS EGDB23F24FA**	
Page		3/61	

Profibus DP and Profibus PA communication

Profibus Remote Master (PRM) module (external)

Ethernet Modbus/TCP	**Profibus DP V1** **Profibus PA (via gateway)**
10BASE-T/100BASE-TX	Isolated RS 485
Two RJ45 connectors (supporting daisy chain topology)	One 9-way female SUB-D connector
CSMA-CD	Master/slave
10/100 Mbps	9.6 Kbps...12 Mbps
Double shielded twisted pair copper cable, category CAT 5E (direct or crossover)	Shielded twisted pair copper cable
Several PRMs can be connected to the Ethernet port on the M340, Premium or Quantum PLC, as long as the I/O scanner capacity is not exceeded	125 slaves
100 m (copper)	1200 (9.6 Kbps), 4800 m with 3 repeaters, 100 m (12 Mbps), 400 m with 3 repeaters
–	
Modbus/TCP messaging	Cyclic and acyclic data exchange with slaves
Transparent Ready Class A20	Class 1 and Class 2
–	
–	
Modbus server (scanned by the PLC)	Master/slave communication
FDR service	Global Control service
SNMP agent network management service	Acyclic communication (read/write) in Class 1 and Class 2
	Support for extended diagnostics
	Auto-scanning service of slaves on the bus
18…30 V	

TCS EGPA23F14F

3/63

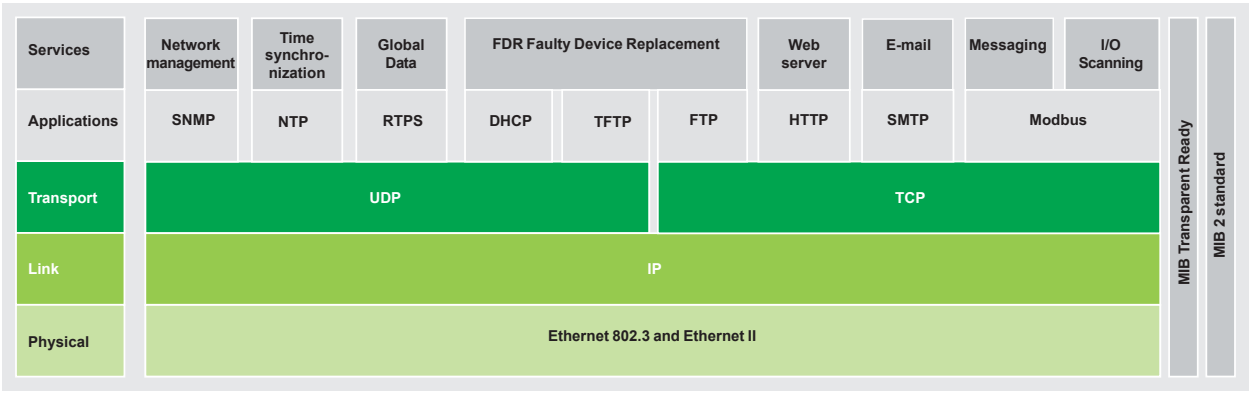
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Presentation

BMX P34 2020/20302 processors via their integrated Ethernet port, **BMX NOE 0100/0110** network modules and the **BMX NOR 0200H** RTU module provide transparent communication on the Ethernet Modbus/TCP network using Transparent Ready communication services.



Ethernet communication services for the BMX NOE 0100/0110 module

The following Transparent Ready communication services are designed for use in automation applications. They supplement the universal Ethernet services (HTTP, BOOTP/DHCP, FTP, etc):

- Modbus/TCP messaging for class 10 or 30 devices
- I/O Scanning service for class 30 devices
- FDR (Faulty Device Replacement) for class 10 or 30 devices
- SNMP *(Simple Network Management Protocol)* network management for class 10 or 30 devices
- Global Data, for class 30 devices
- Bandwidth management for class 10 or 30 devices
- NTP (*Network Time Protocol*) synchronization for class 30 devices
- E-mail alarm notification via SMTP server, via Unity Pro function block

Note: *See selection guide on pages 3/2 and* ***3/3*** ***for the communication services supported by BMX P34 2020/20302*** *processors,* ***BMX NOE 0100/0110*** *network modules and the* ***BMX NOR 0200H*** *RTU module on the Modicon M340 platform.*

The following pages (3/9 to 3/13) present the various options available through all of these services in order to facilitate the optimum choice of solutions when defining a system integrating Transparent Ready devices.

Processors: page 1/2 | I/O: pages 2/2 and 2/14 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions

Ethernet universal services

The universal Ethernet services used are as follows:

■ **HTTP *(HyperText Transfer Protocol)***:
□ This protocol is used for transmitting Web pages between a server and a browser.
□ Web servers embedded in Transparent Ready automation products provide easy access to products located anywhere in the world from a standard web browser such as Internet Explorer.

■ **BOOTP/DHCP** (**RFC1531**):
□ These protocols are used to provide devices with IP parameters automatically. This avoids having to manage each device address individually by transferring this management to a dedicated IP address server.
□ The DHCP protocol *(Dynamic Host Configuration Protocol)* is used to assign configuration parameters to devices automatically. DHCP is an extension of BOOTP.
□ Schneider Electric devices can be "BOOTP clients" (used to retrieve the IP address automatically from a server) or "BOOTP servers" (allowing the device to distribute IP addresses to the network stations).
□ Schneider Electric uses standard BOOTP/DHCP protocols for its FDR *(Faulty Device Replacement) service.*

■ **FTP *(File Transfer Protocol)*** **(RFCs 959, 2228, and 2640)**:
□ This protocol provides the basic elements for file sharing. Many systems use it to exchange files between devices.

■ **TFTP *(File Transfer Protocol)*** **(RFCs 959, 2228, and 2640)**:
□ This network transfer protocol can be used to connect to a device and download code to it.
□ For example, it can be used to transfer a boot code to a workstation without a disk drive or to connect and download updates of network device firmware.
□ Transparent Ready devices implement FTP and TFTP for transferring certain information to or from devices, in particular for downloads of firmware or user-defined Web pages.

■ **SNMP *(Simple Network Management Protocol)*** **(RFCs 1155, 1156 and 1157)**:
□ The SNMP standard manages the various network components via a single system.
□ The network management system can exchange data with SNMP agent devices. This function allows the manager to display the status of the network and devices, modify their configuration and feed back alarms in the event of a fault.
□ Transparent Ready devices are SNMP-compatible and can be integrated naturally in a network managed via SNMP.

■ **COM/DCOM *(Distributed Component Object Model)*** **(RFCs 1155, 1156 and 1157)**:
□ COM/DCOM or OLE *(Object Linking and Embedding)* protocol is the name of the technology consisting of Windows objects which enables transparent communication between Windows applications.
□ These technologies are used in the OFS *(OLE for Process Control Factory Server)* data server software.

Modbus standard communication protocol

Modbus protocol, the industry communication standard since 1979, has been combined with Ethernet Modbus/TCP, the medium for the Internet revolution, to form Modbus/TCP, a completely open Ethernet protocol.
The development of a connection to Modbus/TCP does not require any proprietary component, nor purchase of a license.
This protocol can easily be combined with any product supporting a standard TCP communication stack. The specifications can be obtained free of charge from the following website: **www.modbus-ida.org**.

Processors: page 1/2 | I/O: pages 2/2 and 2/14 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

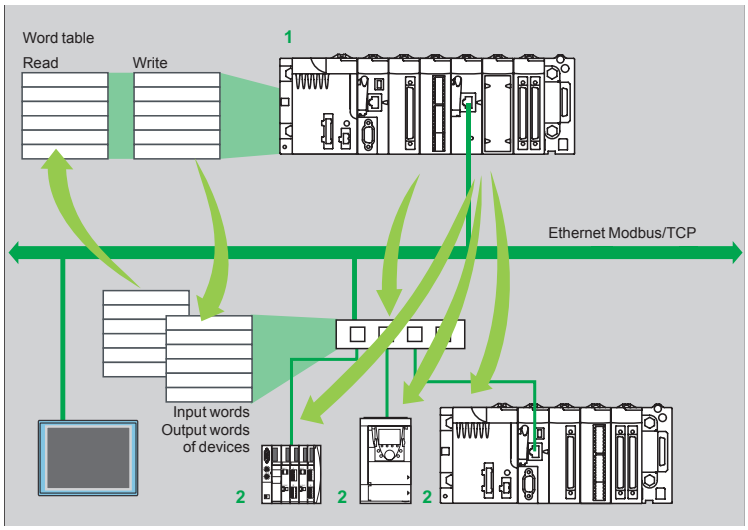
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions (continued)

I/O Scanning service



1 Modicon M340 device with I/O Scanning service

2 Device with Modbus TCP messaging in server mode

The I/O Scanning Service is used to manage the exchange of remote I/O states on the Ethernet network after a simple configuration operation, with no need for special programming.
I/O scanning is performed transparently by means of read/write requests according to the Modbus client/server protocol on the TCP profile.
This principle of scanning via a standard protocol enables a device with the I/O Scanning service to communicate with any device supporting Modbus TCP messaging in server mode.
This service can be used to define:

- A word zone reserved for reading inputs
- A word zone reserved for writing outputs
- Refresh periods independent of the PLC scan

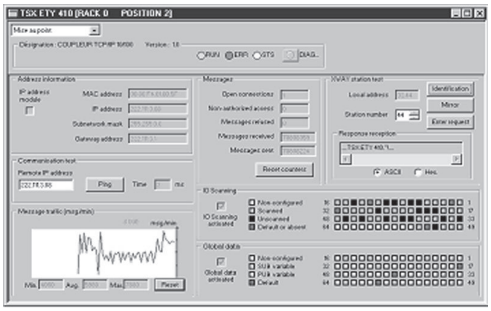
During operation, the module:

- Manages TCP connections with each remote device
- Scans devices and copies the I/O to the configured word zone
- Feeds back status words used to check that the service is working correctly from the PLC application
- Applies pre-configured fallback values if a communication problem occurs

A range of hardware and software products is available enabling the I/O Scanning protocol to be implemented on any type of device that can be connected to the Ethernet network (please consult the Modbus-IDA website: www.modbus-ida.org.

Characteristics

- Each Modicon M340 station can exchange a maximum of **100 words for writing** and 125 words for reading.
- Maximum size in the Modicon M340 PLC that manages the service (64 stations max.) with **BMX NOE 0100/0110** and **BMX NOC 0401** network modules: 2 Kwords (input) and 2 Kwords (output).



I/O Scanning service diagnostics

I/O Scanning service diagnostics can be performed in one of five ways:

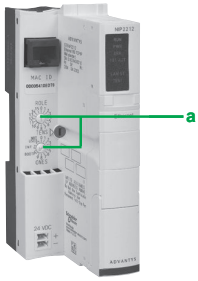
- Via the application program from a specific PLC data zone
- From the setup software debug screen
- From the PLC system diagnostic function displayed by means of an internet browser on a PC station
- Using the **TCS EAZ 01P SFE10** ConneXview diagnostic software
- Using standard SNMP manager software

Processors: page 1/2 | I/O: pages 2/2 and 2/14 | Software: page 4/2 | Ruggedized Modicon M340 modules: page 6/2

Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services



NIM network module for Modicon STB I/O

FDR *(Faulty Device Replacement)* service

The Faulty Device Replacement service uses standard address management technologies (BOOTP, DHCP) and the TFTP *(Trivial File Transfer Protocol)* file management service, with the aim of simplifying maintenance of Ethernet devices. The FDR service is used to replace a faulty device with a new device with the guarantee that it will be detected, reconfigured and automatically rebooted by the system.

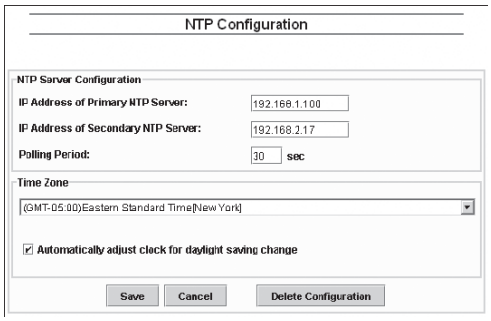
The main steps in replacement are:

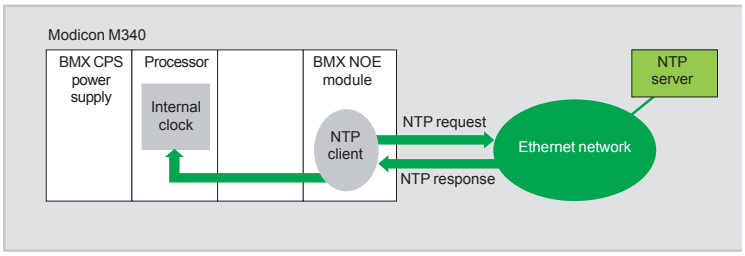
1. A device using the FDR service malfunctions.
2. Another similar device is taken from the maintenance store, preconfigured with the Device name for the faulty device, then reinstalled on the network. Depending on the device, addressing can be performed using rotary selector switches (as for Modicon STB distributed I/O a, or Modicon OTB for example) or can be given using the keypad integrated in the device (as for Altivar variable speed drives for example).
3. The FDR server detects the new device, allocates it an IP address and transfers the configuration parameters to it.
4. The substituted device checks that all these parameters are indeed compatible with its own characteristics and switches to operational mode.

The FDR server can be the **BMX NOE 0100/0110** Ethernet module or the **BMX NOC 0401** module.

NTP time synchronization service

Presentation





The time synchronization service is based on NTP *(Network Time Protocol)* which is used to synchronize the time of a client or a server on Ethernet from a server or another reference time source (radio, satellite, etc).

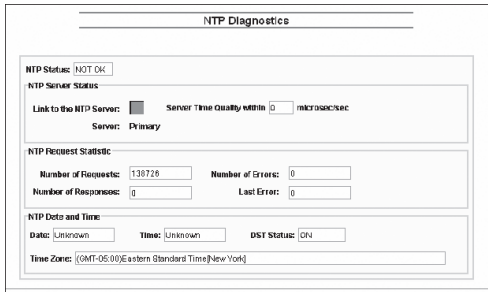
Operation

BMX NOE 0100/0110, **BMX NOC 0401** and **BMX NOR 0200H** Ethernet Modbus/TCP modules have an NTP client component.
These modules connect to an NTP server using a client request (*Unicast*) in order to update their local time. The module clock is updated periodically (1 to 120 s) with typical precision of 5 ms. If the NTP server cannot be reached, the Ethernet TCP/IP module switches to a standby NTP server.

The PLC processor clock is therefore itself updated with a precision of 5 ms. A function block is used to read this clock, thus enabling Unity Pro application events or variables to be time and date stamped.

The Ethernet module is configured by means of a Web page. The time zone can be configured. A time synchronization service (NTP) diagnostic Web page is also available.

Information on the time synchronization service (NTP) is also available in the Transparent Ready private MIB, which can be accessed via the SNMP network management service.



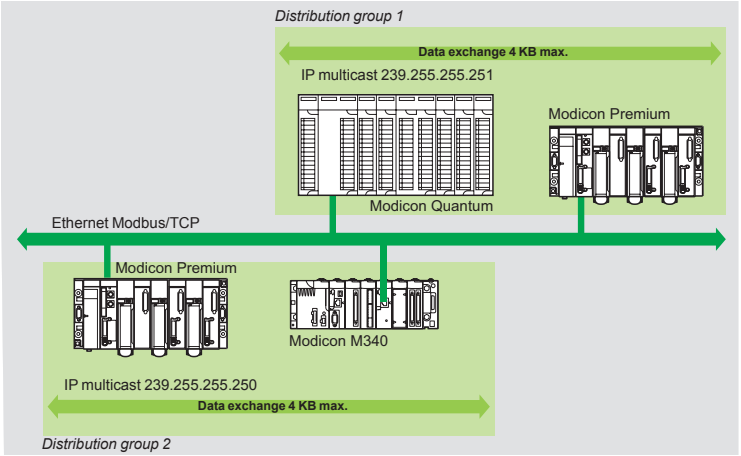
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services

Functions (continued)

Global Data service



The Global Data service performs data exchanges in real time between stations belonging to the same distribution group. It is used to synchronize remote applications, or to share a common database between a number of distributed applications. Exchanges are based on a standard producer/consumer protocol, guaranteeing optimum performance with a minimum load on the network. This RTPS (*Real Time Publisher Subscriber*) protocol is promoted by Modbus-IDA (*Interface for Distributed Automation*), and is already a standard adopted by several manufacturers.

Characteristics

A maximum of 64 stations can participate in Global Data within a single distribution group. Each station can:

- Publish one 1024-byte variable. The publication period can be configured from 1 to n processor master task *(Mast)* periods.
- Subscribe to between 1 and 64 variables. The validity of each variable is controlled by status bits *(Health Status bits)* linked to a refresh timeout configurable between 50 ms and 1s. Access to an element of the variable is not possible. The total size of subscribed variables amounts to 4 K contiguous bytes.

To further optimize the performance of the Ethernet network, Global Data can be configured with the “multicast filtering” option which, together with switches in the ConneXium range (see pages 3/26 to 3/37), broadcasts data only to Ethernet ports where there is a Global Data service subscriber station. If these switches are not used, Global Data is sent in “multicast” mode to all switch ports.

Global Data service diagnostics

The diagnostic screens use a colour code to show the Global Data status:

- Configured/not configured/faulty.
- Published/subscribed.

Global Data service diagnostics can be performed in one of five ways:

- Via the application program from a specific PLC data zone.
- From the setup software debug screen.
- From the PLC system diagnostic function displayed by means of an internet browser on a PC station.
- Using the **TCS EAZ 01P SFE10** ConneXview diagnostic software.
- Using standard SNMP manager software.

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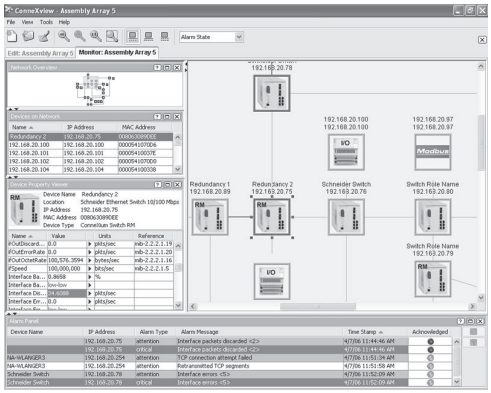
Modicon M340 automation platform

Ethernet Modbus/TCP network

Ethernet Modbus/TCP communication services



Automatic recognition of IP devices via the ConneXview diagnostic software for Ethernet industrial networks

Functions (continued)

SNMP network management service

From a network management station, SNMP *(Simple Network Management Protocol)* monitors and checks all components of the Ethernet architecture and thus ensures quick diagnostics in the event of a problem.
It is used to:
- Interrogate network components such as computer stations, routers, switches, bridges or terminal devices in order to view their status.
- Obtain statistics about the network to which the devices are connected.

This network management software complies with the conventional client/server model. However, to avoid confusion with other communication protocols that use this terminology, we talk instead about:
- ConneXview network diagnostics software, **TCS EAZ 01PSFE10**. For more information, please refer to the “Machines and installations, industrial communication networks” catalogue.
- Network manager for the client application that operates on the computer station.
- SNMP agent for the network device server application.

Transparent Ready devices can be managed by any SNMP network manager, including HP Openview and IBM Netview.

Standard SNMP *(Simple Network Management Protocol)* is used to access configuration and management objects contained in the device MIBs (Management Information Bases). These MIBs must comply with certain standards to be accessed by any commercially-available manager, but depending on the complexity of products, manufacturers can add certain objects to private databases.

The Transparent Ready private MIB presents management objects specific to the Schneider Electric offer. These objects simplify the installation, setup and maintenance of Transparent Ready devices in an open environment using standard network management tools.

Transparent Ready devices support 2 levels of SNMP network management:
- The Standard MIB II interface: This interface accesses a first level of network management. It enables the manager to identify the devices making up the architecture and retrieve general information about the configuration and operation of Ethernet Modbus/TCP interfaces.
- The Transparent Ready MIB interface: This interface improves the management of Transparent Ready devices. This MIB has a set of data enabling the network management system to supervise all the Transparent Ready services.

The Transparent Ready MIB can be downloaded from the FTP server of any Transparent Ready Ethernet module in a PLC.

Modicon M340 automation platform

Ethernet Modbus/TCP network

Standard Web services

Presentation of Web services

The standard Web server functions are integrated in a wide variety of Schneider Electric Ethernet products: Modicon automation platform processors and Ethernet modules, distributed I/O modules, variable speed drives and gateways. These functions are mainly integrated in **BMX P34 2020/20302** processors, in **BMX NOE 0100/ 0110** and **BMX NOC 0401** Ethernet network modules, in the **BMX NOR 0200H** RTU module, and the **TCS EGDB23F24FA** Modbus Plus proxy module on the Modicon M340 platform.

From a simple Internet browser, the standard Web server authorizes the following "ready-to-use" functions:
- Remote diagnostics and maintenance of products
- Display and adjustment of products (read/write variables, status)

With the **BMX NOE 0110** FactoryCast module equipped as standard with the **BMX RWS FC032M** card, the Web server also offers the following functions:
- Management of PLC system and application alarms with partial or total acknowledgement (ready-to-use Alarm Viewer function pages)
- Hosting and display of Web pages created by the user

The embedded Web server is a real-time data server. All the data can be presented in the form of standard Web pages in HTML format and can therefore be accessed using any Web browser that supports the embedded Java code. The standard functions provided by the Web server are supplied "ready-to-use" and thus do not require any programming of either the PLC or the client PC device supporting a Web browser.

Modicon M340 hardware configuration

Standard Web server on the Modicon M340 platform

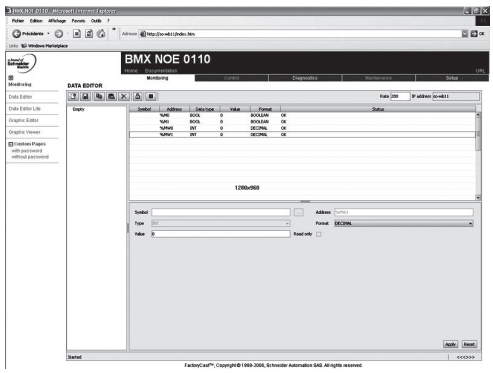
Rack Viewer PLC diagnostics function

The Rack Viewer function can be used for PLC system and I/O diagnostics. It displays the following in real time:
- Status of LEDs on the PLC front panel
- The PLC type and version
- Hardware configuration of the PLC including status of the system bits and words
- Detailed diagnostics of:
  - Each of the I/O module channels or application-specific channels in the configuration
  - Devices connected to the CANopen bus

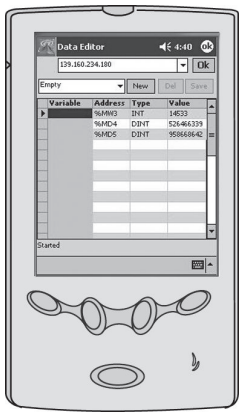
Data Editor read/write function for PLC data and variables

The Data Editor function can be used to create tables of animated variables for real-time read/write access to PLC data in the form of lists.

Various animation tables containing specific application variables to be monitored or modified can be created by the user and saved in the standard Web server module.



Data Editor variables table



In addition to the functions provided by the standard Web server, the **BMX NOE 0110** Ethernet module's FactoryCast Web server offers the following:
- Display of variables: Variables can be entered and displayed either in their symbolic form (S_Pump 234) or as their address (%MW99).
- Write access to variables: This can be enabled or disabled for each of the variables using the FactoryCast module configuration software.
- Read/write function: This can be used on tools such as a pocket PC or PDA terminal.

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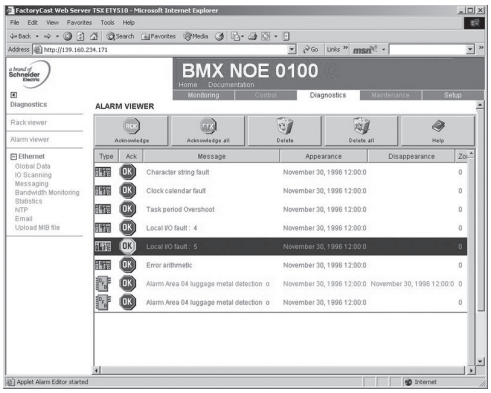
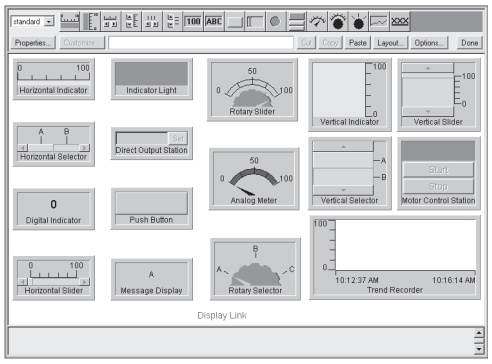
Modicon M340 automation platform

Ethernet Modbus/TCP network

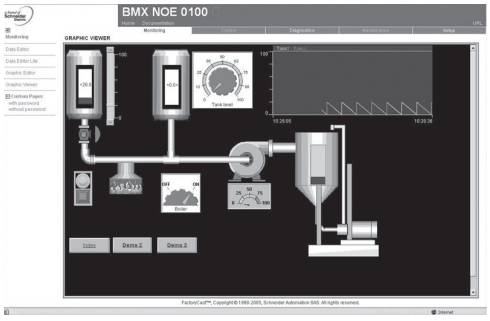
FactoryCast Web services



Alarm display from the diagnostic buffer



Library of predefined graphic objects



Real-time supervision graphic interface

BMX NOE 0100 module FactoryCast Web server

In addition to the standard services, the embedded Web server in the **BMX NOE 0110** FactoryCast module offers the functions described below.

Alarm Viewer function

The alarm viewer is a ready to use, password-protected function. It is used to process alarms (display, acknowledgement and deletion) managed at PLC level by the system or using diagnostic function blocks known as DFBs (system-specific diagnostic function blocks and application-specific diagnostic function blocks created by the user).
These alarms are stored in the diagnostic buffer managed by the Modicon M340 platform (dedicated memory space for storing all the diagnostic events).

The diagnostic viewer is a Web page comprising a list of messages, which displays the following information for each alarm:
- Dates and times of the occurrence/removal of a fault
- Alarm message
- Alarm status
- Type of associated diagnostic function block (DFB)

Graphic Data Editor function

This function is used to create the graphic views animated by the PLC variables that can be accessed via their address or via their symbol (access to located data). The ready-to-use graphic editor is available in online mode when connected to the **BMX NOE 0110** module.

These views are created from a library of predefined graphic objects by simple copy/paste operations. The objects are configured to suit the user's requirements (colour, PLC variables, name, etc).
List of graphic objects available:
- Analog and digital indicators
- Horizontal and vertical bar charts
- Boxes for displaying messages and entering values
- Pushbutton boxes
- Trend recorders
- Vats, valves, motors, etc

Customized graphic objects can be added to this list and can be reused in user Web pages that have been created using standard software for editing HTML pages. The views thus created are saved in the **BMX NOE 0110** module and can be displayed using any Web browser.

User Web page hosting and display function

The **BMX NOE 0110** FactoryCast module has a 16 Mbyte non-volatile memory which is accessed in the same way as a hard drive. This allows hosting of Web pages and any user-defined Word or Acrobat Reader document (for example, maintenance manuals, wiring diagrams, etc).

Web pages can be created using any standard tool for creation and editing in HTML format. They can be enhanced by inserting animated graphic objects linked to PLC variables. These animated objects are created using the Graphic Data Editor. They are then downloaded to the **BMX NOE 0110** module via the FactoryCast Web server configuration software.

These user Web pages can be used, for example, to:
- Display and modify all PLC variables in real time
- Create hyperlinks to other external Web servers (documentation, suppliers, etc)

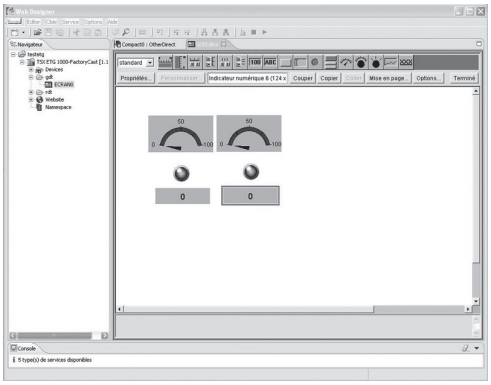
This function is particularly suitable for creating graphic interfaces used for the following purposes:
- Real-time display and supervision
- Production monitoring
- Diagnostics and help with maintenance
- Operator guides

Modicon M340 automation platform

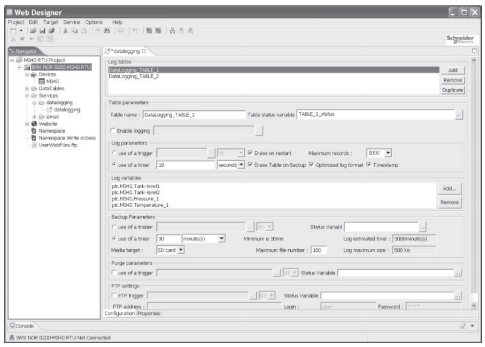
Ethernet Modbus/TCP network

Web Designer configuration software

Web Designer



Graphic Data Editor



Configuring the Data Logging *function for BMX NOR 0200H module*

Web Designer configuration software

The Web Designer software is supplied on CD-ROM with the **BMX NOE 0110**, **BMX NOC 0401** Ethernet network modules and the **BMX NOR 0200H** RTU module.

The software is used for the configuration and administration of the Web server embedded in the modules. It makes it easier to create customized Web human/machine interfaces (HMIs). It is also used for easy configuration of embedded advanced processing functions for numerous Web server modules and RTU modules:

- FactoryCast Web server modules for Modicon M340, Quantum and Premium PLCs
- FactoryCast HMI Web server modules for Modicon Premium and Quantum PLCs
- ETG 1000/3000 FactoryCast Gateways for remote access
- RTU module for Modicon M340

Web Designer software is compatible with the Windows 2000 SP2, Windows XP Professional and Windows Vista Professional 32-bit operating systems.
For optimum use, it requires Java Virtual Machine 1.4.2 minimum.

Web Designer software offers the following functions:

- **Setting the Web Designer function parameters**:
  - Definition of access security, passwords
  - Importing of PLC symbol databases
  - Definition of access to write-enabled variables
- **Management of the Web site**:
  - Management of default site Web pages
  - Management of user site Web pages
  - Graphic Data Editor for animating Web pages *(BMX NOE 0110 module only)*. This integrated editor can be used for easy customization of graphic objects: bar charts, gauges, LEDs, curves, cursors, operator input fields, alphanumeric display fields, buttons, etc.
  - Downloading of Web pages between the PC and the module
  - Debugging of Web pages in online mode or in simulation mode (including animations and Java beans)
- **Simulation mode**:
  - The application and the Web site (including the Java animations) can be set up in online mode or in simulation mode.
  - Simulation mode is used to test the operation of the Web application without a module (with no physical connection to a PLC) thereby simplifying debugging.
- **Creation of user Web pages**:
  - User Web pages are created graphically using an external HTML editor (FrontPage or similar, not supplied).
  - User Web pages created with the graphic editor are actual animated supervisory control screens and can be used to monitor the process. Based on Web technologies (HTML and Java), they provide real-time access to PLC variables using the FactoryCast library of graphic objects (Java beans) *(BMX NOC 0401 module only) (1)*.
- **Data Logging** *(for BMX NOR 0200H module only)*:
  - This service is used to archive the application data: events, alarms, process data, device states, process values, etc.
  - The data are logged in CSV files in ASCII format, which are stored locally on the SD memory card in the BMX NOR 0200H module.
- **Sending alarm notifications or reports via Email or SMS** *(BMX NOR 0200H module only)*:
  - The BMX NOR 0200H module can send e-mails or SMS messages automatically in real time in order to send alarm notifications, maintenance calls, production reports or factory status updates, etc to specified users.
  - E-mails or SMS messages are sent when a predefined application or process is triggered.

(1) Web Designer includes a plug-in for FrontPage 2000. This plug-in makes it easier to set up animations for real-time access to the PLC variables in HTML pages created by the user. They are created in the HTML editor by simply inserting customized graphic objects.

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Modicon M340 automation platform

Ethernet Modbus/TCP network

SOAP/XML Web services

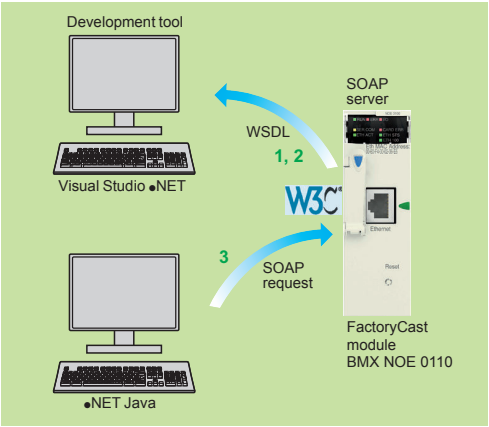
SOAP/XML Web services

BMX NOE 0110, **BMX NOC 0401** Ethernet network modules and **BMX NOR 0200H** RTU modules incorporate a standard SOAP/XML data server that provides direct interoperability between control system devices and computer management applications (MES, ERP, SAP, .Net application, etc).

SOAP/XML Web services embedded in the PLC

These Web services conform to the **W3C** *(World Wide Web Consortium)* Web service standards. They offer standard open communication resources thanks to which the control peripherals can interact directly with computer management applications using a non-proprietary SOAP protocol.

SOAP/XML Web services are based on the following standards:
- **SOAP** *(Simple Object Access Protocol),* the exchange protocol executed via the HTTP *(HyperText Transfer Protocol)* channel
- **WSDL** *(Web Services Description Language)*, in XML format
- **XML** *(eXtensible Markup Language)*, the universal standard for data exchange



ModbusXMLDa Web services: SOAP server interface

The implementation of **ModbusXMLDa** *(Modbus XML Data access)* services in control system device Web servers means IT engineers can easily create their own application to access the desired information directly in the PLC, in real time.

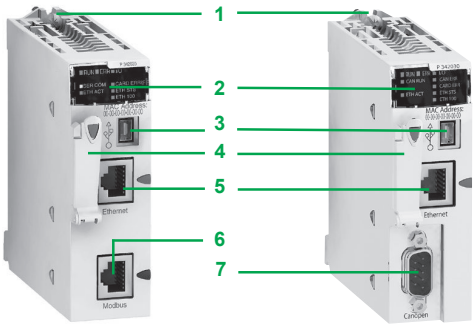
Applications such as Microsoft.NET, SQL Server, Microsoft Office (Excel), IBM (WebSphere), SUN (Java, Eclipse), Lotus, Oracle, SAP, MES, ERP, etc can interact directly with the PLC module Web server.

Exchanges are initiated by the SOAP client application (the server responds to these requests). Data exchanges are made in XML standard format in response to a request using the SOAP protocol.

- **Step 1: Creation of the client application with learning of the Web services**. The development environment (for example, Visual Studio .NET) looks in the FactoryCast server for the list of available services and their WSDL standard interfaces provided by the module.
- **Step 2: Development of the client application**. The developer integrates the Web service functions using the code retrieved at step 1 of the learning process.
- **Step 3: Execution of the client application**. The client application communicates in real time with the FactoryCast Web server module using the SOAP protocol.

Modicon M340 automation platform

Processors with integrated Ethernet Modbus/TCP port



Presentation

BMX P34 2020 and **BMX P34 20302** standard format Modicon M340 processors with integrated Ethernet port occupy a single slot marked “00” in the rack on the Modicon M340 platform.

Description

The front panel of **BMX P34 2020**/**20302** Modicon M340 processors features:

1 A safety screw for locking the module in a slot in the rack.

2 A display block with 8 LEDs, including 3 relating to the Ethernet port:

- ETH ACT LED (green): Activity on the Ethernet network
- ETH STS LED (green): Ethernet network status

Depending on processor version:

- Version 1**:** ETH 100 LED (green): data rate on the Ethernet network (10 or 100 Mbps)
- Version 2 and later**:** ETH LNK LED (green): Ethernet link status

3 A mini B USB connector for a programming terminal (or Magelis XBT GT/GK/GTW HMI terminal).

4 A slot equipped with its Flash memory card for saving the application and activating the standard Web server (Transparent Ready class B10).

5 An RJ45 connector for the connection to the Ethernet network.

Depending on model:

6 **BMX P34 2020** processor: An RJ45 connector for the Modbus serial link or Character mode link (RS 232C/RS 485, 2-wire, non-isolated)

7 **BMX P34 20302** processor: A 9-way SUB-D connector for the master CANopen machine and installation bus.

On the rear panel: 2 rotary switches for selecting the IP address using one of 3 assignment methods:

- Address set by the position of the two switches
- Address set by the application parameters
- Address set by the Ethernet network BOOTP server

BMX P34 2020

BMX P34 20302

References

Description	I/O capacity Memory capacity	Other integrated communication ports	Reference	Weight kg
Processors with integrated Ethernet Modbus/TCP link Transparent Ready class B10	1024 discrete I/O 256 analog I/O 36 app-specific channels 4096 KB integrated	Modbus serial link or Character mode	**BMX P34 2020**	0.205
		CANopen bus	**BMX P34 20302**	0.215

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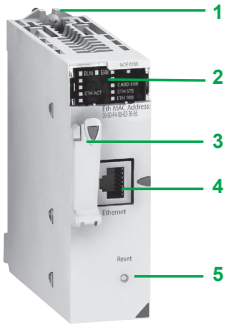
Modicon M340 automation platform

Ethernet Modbus/TCP network modules



BMX NOE 0100/0110

Presentation

BMX NOE 0100 and **BMX NOE 0110** standard format modules occupy a single slot in the rack on the Modicon M340 platform equipped with a Standard or Performance processor.

Description

The front panel of **BMX NOE 0100** and **BMX NOE 0110** modules features:

1 A safety screw for locking the module in a slot in the rack.

2 A display block with 6 LEDs, including 3 relating to the Ethernet port:

- ETH ACT LED (green): Activity on the Ethernet network
- ETH STS LED (green): Ethernet network status

Depending on processor version:

- Version 1**:** ETH 100 LED (green): data rate on the Ethernet network (10 or 100 Mbps)
- Version 2 and later**:** ETH LNK LED (green): Ethernet link status

3 A slot equipped with its Flash memory card for saving the application and activating the Web server (Transparent Ready class B30 or C30 depending on the model).

4 An RJ45 connector for connection to the Ethernet network.

5 A pencil-point RESET pushbutton for a cold restart of the module.

On the rear panel: 2 rotary switches for assigning the IP address in one of three ways:

- Address set by the position of the two switches
- Address set by the application parameters
- Address set by the Ethernet network BOOTP server

References

Description	Data rate	Transparent Ready Class	Reference	Weight kg
Ethernet Modbus/ TCP network modules	10/100 Mbps	B30	**BMX NOE 0100**	0.200
		C30	**BMX NOE 0110** *(1)*	0.200

Spare parts

Description	Size	Supplied as standard with	Reference	Weight kg
Flash memory cards	8 MB	**BMX NOE 0100**	**BMX RWS B000M**	0.002
	32 MB	**BMX NOE 0110**	**BMX RWS FC032M**	0.002

(1) The Web Designer software is supplied on CD-ROM with the BMX NOE 0110 module. This software is used for the configuration and administration of the Web server embedded in the module, see page 3/16.

Modicon M340 automation platform

Modbus/TCP and EtherNet/IP network module

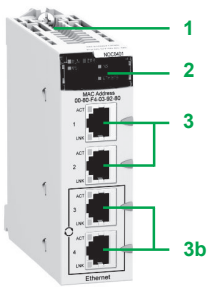
Presentation

The **BMX NOC 0401** network module acts as an interface between the M340 PLC and other Ethernet network devices via the Modbus/TCP and EtherNet/IP communication protocols.

The standard format **BMX NOC 0401** network module occupies a single slot in the rack of the Modicon M340 platform.
This must be equipped with a Standard **BMX P34 1000** or Performance **BMX P34 2●●●●** processor.

Functions

The **BMX NOC 0401** module offers the following functions:
- Modbus/TCP and EtherNet/IP protocols operating simultaneously.
- Ring topologies on 2 Ethernet ports using RSTP *(Rapid Spanning Tree Protocol)*.
- Priority of Ethernet packets using QoS *(Quality of Service) service.*
- Automatic module configuration recovery using FDR *(Faulty Device Replacement) service.*
- Support for SCADA functions via the OPC *protocol.*
- Embedded Web server for application monitoring and module diagnostics.
- Sharing data between PLCs.
- Network management using SNMP *(Simple Network Management Protocol)*.



Description

The front panel of the **BMX NOC 0401** module features:
1 A safety screw for locking the module in a slot in the rack.
2 A display block with 5 LEDs:
- RUN LED (green): Operating status
- ERR LED (red): Error detected
- MS LED (green/red): Module status
- NS LED (green/red): Network connection status
- ETH STS LED (amber): Ethernet link status

3 Four RJ45 connectors for connection to the Ethernet network. The two bottom connectors **3b** support ring topologies (RSTP protocol).

Each RJ45 connector has two associated LEDs:
- LNK LED (yellow): Ethernet link established
- ACT LED (green): Transmission/reception activity

On the rear panel, 2 rotary switches for selecting the IP address module using one of 4 assignment methods:
- IP address defined by the Ethernet network BootP server
- IP address configured by the application parameters
- Default IP address
- IP address defined by the position of the 2 rotary switches

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Modicon M340 automation platform

Modbus/TCP and EtherNet/IP network module

BMX NOC 0401

References

Description	Data rate	Transparent Ready Class	Reference	Weight kg
EtherNet/IP, Modbus/TCP network module	10/100 Mbps	B30	**BMX NOC 0401** *(1)*	0.345

(1) The "Unity Pro configuration tool" software is supplied on CD-ROM with the module. This software is used to update the Unity Pro hardware catalogue (addition of the new module DTMs).

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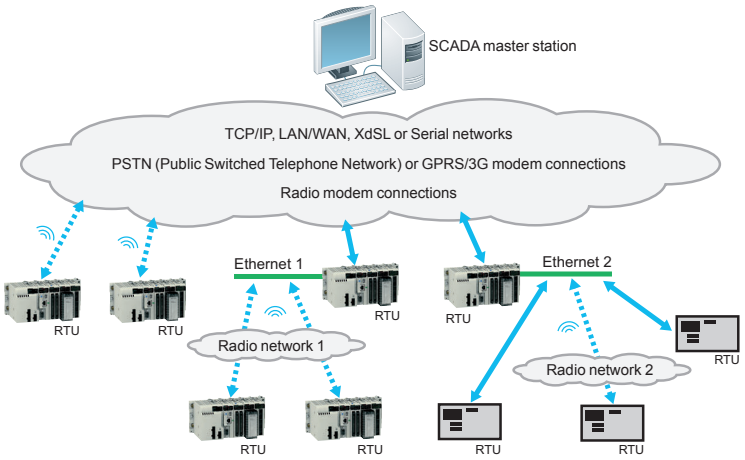
Modicon M340 automation platform
RTU communication systems

Presentation

RTU systems are designed to meet the needs of the water industry, the oil and gas sector and other infrastructures, where remote monitoring and telecontrol are essential to the good management of sites and substations spread over a wide geographical area.

RTU protocols and Telemetry systems provide robust, reliable means of communication which are suitable for the process values, maintenance and remote monitoring needs of infrastructures disseminated over a vast geographical area which may be difficult to access.

An RTU system consists of the following elements:
- A Telemetry Supervisor (SCADA) in a central control room
- A network infrastructure and a variety of suitable communication methods (LAN, WAN, modems, etc)
- A large number of RTU substations geographically distributed throughout the field



Example of an RTU system architecture

Main functions

The main RTU system functions are as follows:
- Remote communications:
  - Between remote RTU sites (coordination, synchronization)
  - With the SCADA host system, controlling the central operator station (monitoring, alarm reports) and centralized databases (archiving of alarms or events)
  - With the on-call staff (alarm indication)
  - With the technical station (diagnostics, maintenance)

- Data acquisition, processing and memorization:
  - Process data sampling using standard or dedicated sensors, validation
  - Exchange of data with other devices within the station, including controllers and operator consoles
  - Use of digital or analog I/O, serial links, fieldbuses and LANs
  - Event detection, time and date stamping, prioritization and logging as required by the application

- Other functions:
  - IEC 1131-3 programmable control: forcing, access control, load sharing, servo control
  - Data logging
  - Alarm and report notification by e-mail/SMS
  - Web HMI: displaying the process, alarm handling, trend analysis, telecontrol

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Modicon M340 automation platform

RTU communication protocols

Presentation (continued)

Currently, people working in the industrial Telemetry sectors use standard protocols for communication between control centres (SCADA) and RTU stations.

The most commonly used protocols are as follows:
- IEC 60870-5: IEC (International Electrotechnical Commission), in particular IEC 60870-5-101/104 (commonly known as IEC 101 or 104)
- DNP3: Distributed Network Protocol version 3

DNP3 is the predominant protocol in North America, Australia and South Africa whereas, in certain European countries, the IEC protocol is required by the legislation. IEC is also commonly used in the Middle East.

The geographical distribution of these protocols is as follows:
- DNP3: North America, Australia, New Zealand, UK, etc, *Asia*, *South America*
- IEC 60870-5: Europe, Middle East, etc, *Asia*, *South America*

These protocols offer similar functions.
They are both particularly suited to “transient communications” (modem, radio) and data exchanges with limited bandwidth for the following reasons:
- They transfer data in a very robust and reliable manner between the SCADA system and the RTU devices
- They are essentially “event-triggered” protocols (exchanges on changes of state, exchanges of time and date stamped events).

They offer the following transmission modes:
- Interrogation via polling
- Data exchanges on changes of state *(RBE: Report By Exception)*
- Unsolicited messaging (a slave station can start an exchange of data with the master station).

Both protocols offer native data management and time and date stamped events:
- Time synchronization between the master station and auxiliary stations via protocol functions
- Time and date stamping of data and events
- Automatic transfer of time and date stamped events between the RTU stations and SCADA (control room).

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Modicon M340 automation platform
RTU communication module

Presentation (continued)

The **BMX NOR 0200H** communication module integrates the RTU *(Remote Terminal Unit)* functions and protocols in the Modicon M340 platform, for industrial Telemetry applications and other widely distributed infrastructures.

The **BMX NOR 0200H** module can be used to connect an RTU M340 PLC directly to a Telemetry supervisor or to other RTU stations, via the standard DPN3 protocols (subset level 3) or IEC 60870-5-101/104 with different connection methods: Ethernet TCP/IP, LAN, WAN, serial link or modem connections (radio, PSTN, GSM, GPRS/3G, ADSL).

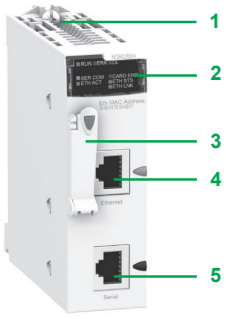
The **BMX NOR 0200H** module is designed to operate in a harsh environment (conformal coating), in an extended temperature range (-25 to +70°C).

Functions

The **BMX NOR 0200H** module offers the following functions:
- Upstream RTU communication to the SCADA (server or slave mode)
- Downstream RTU communication to field devices (master mode)
- RTU protocols: Time synchronization, exchanges of time and date stamped data via polling (on change of state and unsolicited), management of time and date stamped events
- Application Data Logging with time and date stamping in the module Flash memory card
- Event notifications via e-mail or SMS
- Embedded Web server for setting the RTU protocol parameters, diagnostics and monitoring

- Communications on Ethernet port:
  - 10BASE-T/100BASE-TX physical interface
  - Modbus/TCP protocol (client and server)
  - Integrated RTU protocols for Ethernet communications: DNP3 IP (client or server) and IEC 60870-5-104 (over IP) (client or server)
  - Connection of ADSL external modem on the Ethernet port, via the PPPoE *(Point-to-Point Protocol over Ethernet) protocol*
  - Advanced Ethernet functions: NTP client, FTP client or server, HTTP server, SOAP/XML server, SNMP agent, SMTP agent

- Communications on serial port:
  - Non-isolated RS232/RS485 point-to-point serial links
  - Integrated RTU protocols for serial and modem communications: IEC 60870-5-101 (master or slave) and DNP3 serial (master or slave)
  - Connection of external modems (radio, PSTN, GSM, GPRS/3G) via the PPP *(Point-to-Point Protocol)* protocol



Description

The **BMX NOR 0200H** module can be installed in either a standard or “ruggedized” configuration, equipped with a standard **BMX P34 ●●●●●** or “ruggedized” **BMX P34 ●●●●●H** processor.

The front panel of the **BMX NOR 0200H** module features:
1. A safety screw for locking the module in a slot in the rack.
2. A display block with 8 LEDs, 4 of which relate to the serial and Ethernet communication ports.
3. A slot for a Flash memory card (SD card), with protective cover.
4. An RJ45 connector for the connection to the Ethernet network.
5. An RJ45 connector for connection of the serial link or an external modem.

On the rear panel, 2 rotary switches for selecting the IP address assignment method for the module.

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Modicon M340 automation platform

RTU communication module

BMX NOR 0200H

References

Description	Communication port	Protocol	Reference	Weight kg
RTU communi-cation module *(1)*	Ethernet 10BASE-100BASE-TX	■ Modbus/TCP (client or server), Transparent Ready class C30 ■ DNP3 IP (client or server) ■ IEC 60870-5-104 (over IP) (client or server)	**BMX NOR 0200H** *(2)*	0.205
	Serial, External modems	■ Non-isolated RS232/ RS485 point-to-point serial links ■ DNP3 serial (master or slave) ■ IEC 60870-5-101 (master or slave)		

Spare parts

Description	Usage	Supplied with module	Reference	Weight kg
128 MB Flash memory card supplied as standard with the module	Web pages, Storage of data logging files (CSV)	BMX NOR 0200H	**BMX RWS 128MWF**	0.002

(1) See ruggedized module characteristics, pages 6/2 and 6/8.
(2) The Web Designer software is supplied on CD-ROM with the module. This software can be used to configure and download the embedded website and to configure advanced services: data logging, sending alarm notifications via SMS or e-mail, see page 3/16.

3

Ethernet network
Cabling system
ConneXium Hub and Transceiver

Type of device			**Hub**
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T ports
		Shielded connectors	RJ45
		Medium	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m
	Fibre optic ports	Number and type	–
		Connectors	–
		Medium	–
	Length of optical fibre	50/125 µm	–
		62.2/125 µm	–
	Optical fibre attenuation analysis	50/125 µm fibre	–
		62.2/125 µm fibre	–
Topology	Number of hubs	Cascaded	4 max.
		In a ring	–
Redundancy			P1 and P2 redundant power supplies
Power supply	Voltage		24 V ⎓ (18…32), safety extra low voltage (SELV)
	Consumption		80 mA (130 max. at 24 V ⎓)
	Removable terminal block		5-way
Operating temperature			0…+ 60°C
Relative humidity			10…95% non condensing
Degree of protection			IP 30
Dimensions		W x H x D	40 x 125 x 80 mm
Mounting			On symmetrical DIN rail, 35 mm wide
Weight			0.530 kg
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick
			FM 3810, FM 3611 class 1 division 2
LED indicators			Power supply, activity, link
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)
Reference			**499 NEH 104 10**
Pages			3/42

Transceiver

1 x 100BASE-TX port
RJ45
Shielded twisted pair, category CAT 5E
100 m
1 x 100BASE-FX port
SC
Multimode optical fibre
3000 m *(1)*
3000 m *(1)*
8 dB
11 dB
–
–
P1 and P2 redundant power supplies
24 V ⎓ (18…32), safety extra low voltage (SELV)
160 mA (190 max. at 24 V ⎓)
5-way
0…+ 60°C
10…95% non condensing
IP 20
47 x 135 x 111 mm
On symmetrical DIN rail, 35 mm wide
0.230 kg
cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick
P1 and P2 power supplies, Ethernet link/port status
Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)

499 NTR 101 00

3/42

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)

Ethernet network
Cabling system
ConneXium unmanaged switches

3

Type of device			**Unmanaged switches, copper twisted pair**	
Interfaces	Copper cable ports	Number and type	5 x 10BASE-T/100BASE-TX ports	8 x 10BASE-T/100BASE-TX ports
		Shielded connectors	M12 (type D)	RJ45
		Medium	Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m	
	Fibre optic ports	Number and type	–	
		Connectors	–	
		Medium	–	
	Length of optical fibre	50/125 µm	–	
		62.2/125 µm	–	
	Optical fibre attenuation analysis	50/125 µm fibre	–	
		62.2/125 µm fibre	–	
	Ethernet services		Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports)	–
Topology	Number of switches	Cascaded	Unlimited	
		Redundant in a ring	–	
Redundancy			–	P1 and P2 redundant power supplies
Power supply	Voltage		24 V ⎓ (18…32), safety extra low voltage (SELV)	
	Consumption		100 mA max.	125 mA (290 mA max.)
	Removable terminal block		5-way, M12 (type A, male)	5-way
Operating temperature			0…+ 60°C	
Relative humidity			–	10…95% non condensing
Degree of protection			IP 67	IP 20
Dimensions		W x H x D	60 x 126 x 31 mm	47 x 135 x 111 mm
Mounting			–	On symmetrical DIN rail, 35 mm wide
Weight			0.210 kg	0.230 kg
Conformity to standards			cUL 508 and CSA 22.2 No. 142	cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick
LED indicators			Power supply, link status, data rate	P1 and P2 power supplies, Ethernet link/port status
Alarm relay			–	Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)
Reference			**TCS ESU 051F0**	**499 NES 181 00**
Pages			3/43	

Unmanaged switches, copper twisted pair (continued)	Unmanaged switches, 4 and 5 ports, copper twisted pair and fibre optic		
8 x 10BASE-T/100BASE-TX ports	3 x 10BASE-T/100BASE-TX ports	4 x 10BASE-T/100BASE-TX ports	5 x 10BASE-T/100BASE-TX ports
RJ45	RJ45		
Shielded twisted pair, category CAT 5E	Shielded twisted pair, category CAT 5E		
100 m	100 m		
–	–	1 x 100BASE-FX port	–
–	–	Duplex SC	–
–	–	Multimode optical fibre	–
–	–	5000 m *(1)*	–
–	–	4000 m *(1)*	–
–	–	8 dB	–
–	–	11 dB	
Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports), automatic change of polarity	Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbps and duplex mode (on all ports)		
Unlimited	Unlimited		
–	–		
–	–		
24 V ⎓ (9.6…32) SELV	24 V ⎓ (9.6…32 V) safety extra low voltage (SELV)		
4.1 W max.	2.2 W max.	3.9 W max.	2.2 W max.
3-way	3-way removable screw terminal block		
0…+ 60°C	0…+ 60°C		
95% max. without condensation	95% max. without condensation		
IP 30	IP 30		
35 x 138 x 121 mm	25 x 114 x 79 mm		
On symmetrical DIN rail, 35 mm wide	On symmetrical DIN rail, 35 mm wide		
0.246 kg	0.113 kg	0.120 kg	0.113 kg
UL 508 and CSA 22.2 No.142 IEC/EN 61131-2, IEC 60825-1 class 1, CISPR 11A	UL 508 and CSA 22.2 No. 142 IEC/EN 61131-2, IEC 60825-1 class 1, CISPR 11A		
Power supply, copper port activity, 10 or 100 Mbps data rate	Power supply, copper port activity, 10 or 100 Mbps data rate		
	–	Fibre port activity and status	–
–	–		
TCS ESU 083FN0	**TCS ESU 033FN0**	**TCS ESU 043F1N0**	**TCS ESU 053FN0**
3/43	3/44		

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)

Ethernet network
Cabling system
Managed and unmanaged ConneXium switches

Type of device			**Unmanaged switches, 5 ports, copper twisted pair and fibre optic**			
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fibre optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
		Connectors	SC			
		Medium	Multimode optical fibre		Single mode optical fibre	
	Length of optical fibre	50/125 µm	5000 m *(1)*		–	
		62.2/125 µm	4000 m *(1)*		–	
		9/125 µm fibre	–		32,500 m *(2)*	
	Optical fibre attenuation analysis	50/125 µm fibre	8 dB		–	
		62.2/125 µm fibre	11 dB		–	
		9/125 µm fibre	–		16 dB	
	Ethernet services		–			
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	–			
Redundancy			P1 and P2 redundant power supplies			
Power supply	Voltage		24 V ⎓ (18…32 V) safety extra low voltage (SELV)			
	Consumption		200 mA max.	240 mA max.	200 mA max.	240 mA max.
	Removable terminal block		5-way			
Operating temperature			- 40...+ 70°C			
Relative humidity			10…95% non condensing			
Degree of protection			IP 20			
Dimensions	W x H x D		47 x 135 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.330 kg	0.335 kg	0.330 kg	0.335 kg
Conformity to standards			cUL 60950, cUL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL, C-Tick			
LED indicators			P1 and P2 power supplies, Ethernet link status, transmission activity			
Alarm relay			Activity, power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
Reference			**499 NMS 251 01**	**499 NMS 251 02**	**499 NSS 251 01**	**499 NSS 251 02**
Pages			3/44			

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m)

Managed switches, 4 ports, copper twisted pair and fibre optic

3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports	3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports
RJ45			
Shielded twisted pair, category CAT 5E			
100 m			
1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
Duplex SC			
Multimode optical fibre		Single mode optical fibre	
5000 m *(1)*		–	
4000 m *(1)*		–	
–		32,500 m *(2)*	
8 dB		–	
11 dB		–	
–		16 dB	
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port			
Unlimited			
50 max.			
Redundant power supplies, redundant single ring, ring coupling			
9.6...60 V ⎓/18…30 V ∿ safety extra low voltage (SELV)			
6.5 W	7.3 W	6.5 W	7.3 W
6-way			
0…+ 60°C			
10… 90% non-condensing			
IP 20			
47 x 131 x 111 mm			
On symmetrical DIN rail, 35 mm wide			
0.400 kg			
IEC 61131-2, IEC 61850-3, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 142 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick			
Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity			
Power supply fault, Ethernet network fault, communication port fault, redundancy fault (volt-free contact 1 A max. at 24 V ⎓)			
TCS ESM 043F1CU0	**TCS ESM 043F2CU0**	**TCS ESM 043F1CS0**	**TCS ESM 043F2CS0**
3/45			

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m)

Ethernet network
Cabling system
ConneXium managed switches

Type of device			**Managed switches, 4 and 8 ports, copper twisted pair**	
Interfaces	Copper cable ports	Number and type	4 x 10/100BASE-TX ports	3 x 10/100BASE-TX ports
		Shielded connectors	RJ45	
		Medium	Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m	
	Fibre optic ports	Number and type	–	
		Connectors	–	
		Medium	–	
	Length of optical fibre	50/125 µm	–	
		62.2/125 µm	–	
		9/125 µm fibre	–	
	Attenuation analysis	50/125 µm fibre	–	
		62.2/125 µm fibre	–	
		9/125 µm fibre	–	
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port	
Topology	Number of switches	Cascaded	Unlimited	
		Redundant in a ring	50 max.	
Redundancy			P1 and P2 redundant power supplies, redundant single ring, ring coupling	
Power supply	Voltage		9.6...60 V ⎓/18…30 V ∿ safety extra low voltage (SELV)	
	Consumption		5.3 W	
	Removable terminal block,		6-way	
Operating temperature			0...+ 60°C	
Relative humidity			10…90% non-condensing	
Degree of protection			IP 20	
Dimensions		W x H x D	47 x 131 x 111 mm	74 x 131 x 111 mm
Mounting			On symmetrical DIN rail, 35 mm wide	
Weight			0.400 kg	0.410 kg
Conformity to standards			IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick	
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity	Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)	
Reference			**TCS ESM 043F23F0**	**TCS ESM 083F23F0**
Pages			3/45	

Managed switches, 8 ports, copper twisted pair and fibre optic

7 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports	7 x 10/100BASE-TX ports	6 x 10/100BASE-T ports
RJ45			
Shielded twisted pair, category CAT 5E			
100 m			
1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
Duplex SC			
Multimode optical fibre		Single mode optical fibre	
5000 m *(1)*		–	
4000 m *(1)*		–	
–		32,500 m *(2)*	
8 dB		–	
11 dB		–	
–		16 dB	
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port			
Unlimited			
50 max.			
Redundant power supplies, redundant single ring, ring coupling			
9.6...60 V ⎓/18…30 V ∿, safety extra low voltage (SELV)			
6.5 W	7.3 W	6.5 W	7.3 W
6-way			
0…+ 60°C			
10… 90% non-condensing			
IP 20			
75 x 131 x 111 mm			
On symmetrical DIN rail, 35 mm wide			
0.410 kg			
IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick			
Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity			
Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)			
TCS ESM 083F1CU0	**TCS ESM 083F2CU0**	**TCS ESM 083F1CS0**	**TCS ESM 083F2CS0**
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(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m)

3

Type of device			**Managed switches, 8 extended ports, copper twisted pair and fibre optic**		
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports	6 10/100BASE-T ports
		Shielded connectors	RJ45		
		Medium	Shielded twisted pair, category CAT 5E		
		Total length of pair	100 m		
	Fibre optic ports	Number and type	–	2 x 100BASE-FX ports	
		Connectors	–	Duplex SC	
		Medium	–	Multimode optical fibre	Single mode optical fibre
	Length of optical fibre	50/125 µm	–	5000 m *(1)*	–
		62.2/125 µm	–	4000 m *(1)*	–
		9/125 µm fibre	–	–	32,500 m *(2)*
	Attenuation analysis	50/125 µm fibre	–	8 dB	–
		62.2/125 µm fibre	–	11 dB	–
		9/125 µm fibre	–	–	16 dB
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port		
Topology	Number of switches	Cascaded	Unlimited		
		Redundant in a ring	50 max.		
Redundancy			Redundant power supplies, redundant single ring, ring coupling, rings supporting MRP, Fast Hiper Ring and RSTP		
Power supply	Voltage		18...60 V ⎓		
	Consumption		10 W	12 W	
	Removable terminal block		2 terminal blocks, 2-way		
Operating temperature			0...+ 60°C		
Relative humidity			10…90% non-condensing		
Degree of protection			IP 30		
Dimensions		W x H x D	120 x 137 x 115 mm		
Mounting			On symmetrical DIN rail, 35 mm wide		
Weight			1 kg		
Conformity to standards			IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 class 1 division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 class 1 division 2 (cUL), CE, GL, C-Tick, LR, BV		
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓, 2-way)		
Reference			**TCS ESM 083F23F1**	**TCS ESM 063F2CU1**	**TCS ESM 063F2CS1**
Pages			3/46		

1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)
(2) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 15,000 m)

Managed switches, 16 and 24 ports, copper twisted pair and fibre optic

16 x 10/100BASE-TX ports	14 x 10/100BASE-TX ports	22 x 10/100BASE-TX ports
RJ45		
Shielded twisted pair, category CAT 5E		
100 m		
–	2 x 100BASE-FX ports	
–	Duplex SC	
–	Multimode optical fibre	
–	5000 m *(1)*	
–	4000 m *(1)*	
–	–	
–	8 dB	
–	11 dB	
–	–	
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port		
Unlimited		
50 max.		
Redundant power supplies, redundant single ring, ring coupling		
9.6...60 V ⎓/18…30 V ∿ safety extra low voltage (SELV)		
9.4 W	11.8 W	15.5 W
6-way		
0…+ 60°C		
10… 90% non-condensing		
IP 20		
111 x 131 x 111 mm		
On symmetrical DIN rail, 35 mm wide		
0.600 kg		0.650 kg
cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2		
Redundant power supplies, single ring	Redundant power supplies, single ring, double ring	
Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)		
TCS ESM 163F23F0	**TCS ESM 163F2CU0**	**TCS ESM 243F2CU0**
3/47		

(1) Length dependent on the attenuation analysis and attenuation of the optical fibre (typical value: 2000 m)

3

Type of device			**Managed switches, 8 ports and 2 Gigabit ports, copper twisted pair and fibre optic**		
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports		
		Shielded connectors	RJ45		
		Medium	Shielded twisted pair, category CAT 5E		
		Total length of pair	100 m		
	Fibre optic Gigabit ports (with SFP fibre optic module to be mounted on SFP connector)	Number and type	2 x 1000BASE-SX ports *(1)*	2 x 1000BASE-LH ports *(2)*	2 x 1000BASE-LX ports *(3)*
		Connectors	LC		
		Medium	Multimode optical fibre	Single mode optical fibre	Single mode and multimode optical fibre
	Length of optical fibre	50/125 µm	550 m	–	550 m
		62.2/125 µm	275 m	–	550 m
		9/125 µm fibre	–	8 - 72,000 m	20,000 m
	Attenuation analysis	50/125 µm fibre	7.5 dB	–	11 dB
		62.2/125 µm fibre	7.5 dB	–	11 dB
		9/125 µm fibre	–	6 - 22 dB	11 dB
	Ethernet services		FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port		
Topology	Number of switches	Cascaded	Unlimited		
		Redundant in a ring	50 max.		
Redundancy			Redundant power supplies, redundant single ring, ring coupling		
Power supply	Voltage		9.6...60 V ⎓/18…30 V ∿ safety extra low voltage (SELV)		
	Consumption		8.9 W + 1 W per SFP fibre optic module		
	Removable terminal block		6-way		
Operating temperature			0...+ 60°C		
Relative humidity			10…90% non-condensing		
Degree of protection			IP 20		
Dimensions		W x H x D	111 x 131 x 111 mm		
Mounting			On symmetrical DIN rail, 35 mm wide		
Weight			0.410 kg		
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL		
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)		
Reference			**TCS ESM 103F2LG0**		
Pages			3/47		

*(1) With **TCS EAA F1LFU00** fibre optic module to be ordered separately (see page 3/41)*
*(2) With **TCS EAA F1LFH00** fibre optic module to be ordered separately (see page 3/41)*
*(3) With **TCS EAA F1LFS00** fibre optic module to be ordered separately (see page 3/41)*

Managed switches, 8 ports and 2 Gigabit ports, copper twisted pair and fibre optic

8 x 10/100BASE-TX ports and 2 x 10/100/1000BASE-TX (Gigabit) ports
RJ45
Shielded twisted pair, category CAT 5E
100 m
–
LC
–
–
–
–
–
–
–
FDR, SMTP V3, SNTP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access,VLAN, IGMP Snooping, RSTP *(Rapid Scanning Tree Protocol)*, priority port, data stream control, secure port
Unlimited
50 max.
Redundant power supplies, redundant single ring, ring coupling
9.6...60 V ⎓/18…30 V ∿ safety extra low voltage (SELV)
8.3 W
6-way
0...+ 60°C
10…90% non-condensing
IP 20
111 x 131 x 111 mm
On symmetrical DIN rail, 35 mm wide
0.410 kg
cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 class 1 division 2, CE, GL
Power supply status, alarm relay status, active redundancy, redundancy management, fibre port status and fibre port activity
Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at 24 V ⎓)

TCS ESM 103F23G0

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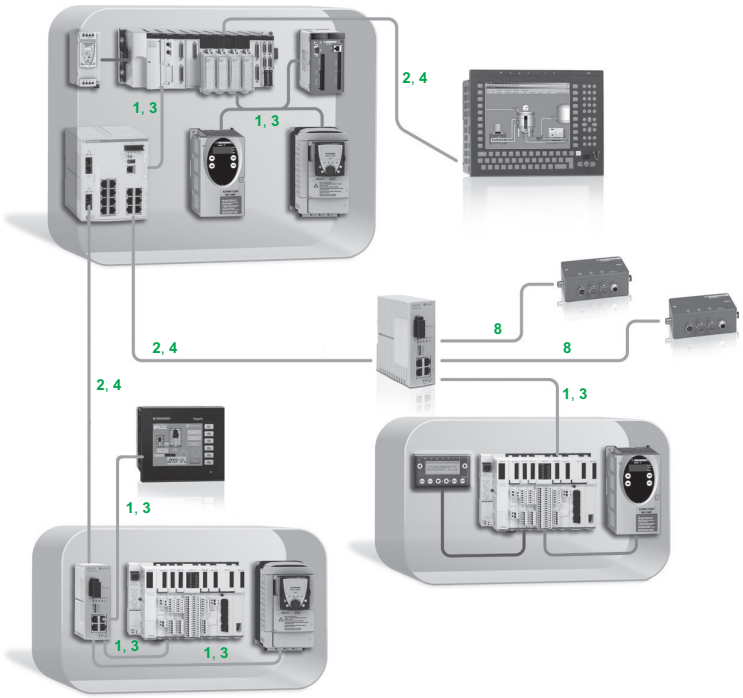
Ethernet network
Infrastructure

Presentation

Schneider Electric offers copper and fibre optic cables for connecting IP 20 and IP 67 Ethernet devices.

Examples

Mixed IP 20 and IP 67 wiring (copper)

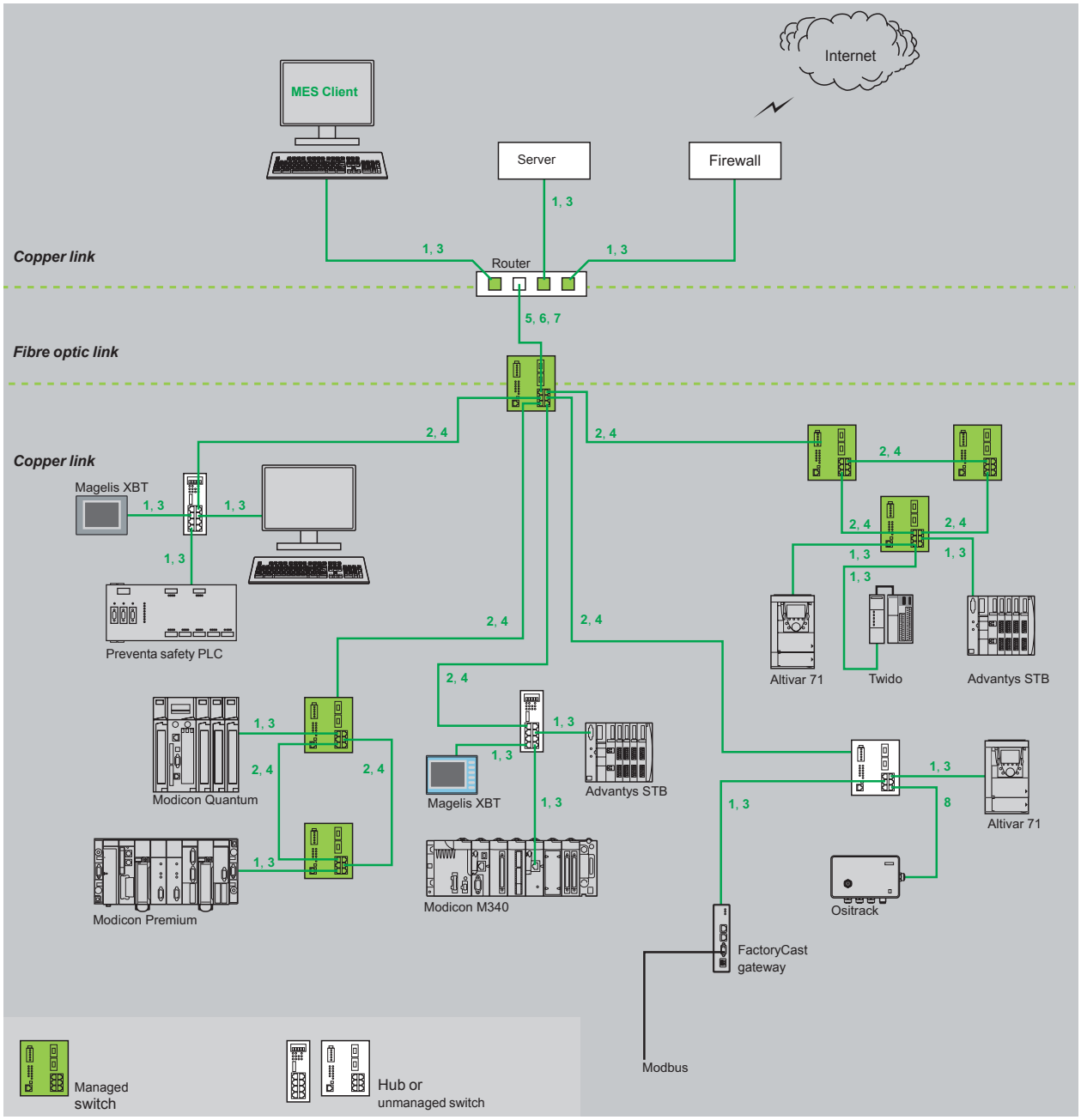


Key:
1, 3: Straight-through copper cables
2, 4: Crossover copper cables
8: Cables with IP 67 connector (see pages 3/40 and 3/41)

Wi-Fi network:
page 3/48

Examples (continued)

Mixed copper and fibre optic wiring



Key:
1, 3: Straight-through copper cables
2, 4: Crossover copper cables
5, 6, 7: Fibre optic cables
8: Cables with IP 67 connector (see pages 3/40 and 3/41)

Wi-Fi network:
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